MINEVILLE, NEW YORK: A CONCRETE INDUSTRIAL VILLAGE
IN THE HEART OF THE ADIRONDACK FORESTS

Ann-Isabel Friedman

A THESIS

in

The Graduate Program in Historic Preservation

Presented to the Faculties of the
University of Pennsylvania in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

1990

Samuel Y. Harris, P.E., Adjunct Associate Professor,
Historic Preservation, Advisor

John Milner, R.A., Adjunct Associate Professor,
Historic Preservation, Reader

David G. De Long, Graduate Group Chairman

CONTENTS

ABSTRACT

This study examines the history of a turn-of-the-century company town, concentrating on the mining company's use of cement block in the construction of workers' housing, placing this use of block in the context of contemporary concrete construction, and assessing the mining company's use of iron ore tailings as aggregate in the manufacture of concrete block. Within the complex of turn-of-the-century company housing, a core area was selected, and the twenty-five tailings block houses within this area surveyed from the exterior. This survey provided clues about the construction of the houses, while an assessment of the design of each house provided a means of comparison between Mineville's tailings block houses and other, contemporary company housing developments. In order to evaluate the material properties of the tailings block, laboratory tests were conducted on samples of the material, and the results were compared with those of tests conducted at the time of manufacture. The study concludes with a brief description of the present condition of the houses within the survey group, and recommendations for the future repair and preservation of tailings block houses.

A survey of contemporary trade literature, in both the

concrete and iron and steel industries, constitute the primary documents. In addition, oral interviews were conducted, and local archives examined. Secondary sources were consulted to provide background on the development of the mining community and the history of the Witherbee-Sherman Company.

When the study was initiated, the Witherbee-Mineville community, and particularly the tailings block houses themselves, were suffering from the results of twenty-five years of economic depression, neglect, and obscurity. More recently, industrial archaeologists have initiated a study of the mining history of the region; the county, with assistance from the state, has conducted a survey of the historic resources of the town of Moriah, including the tailings block houses; and several real estate development schemes have been proposed for this hilly lakefront community. It is hoped that both this scholarly attention and the projected economic development will help this struggling community survive into its second century and beyond.

ACKNOWLEDGMENTS

My Introduction to Mineville

In August of 1978, exactly ten years before I began to research the history of Mineville's tailings block houses, I met Marcy Vaughn Porter: my personal ambassador, mentor, and guide to the joys of Moriah, motherhood, and "old-timey" music. Perhaps our meeting under the masonry arches of one of Cornell's gothic arcades was auspicious: eight years later we would continue our friendship as working colleagues, actually making a living by inspecting the masonry of academic buildings. Marcy grew up in Port Henry, and with her parents, Peggy and Charlie Porter, introduced me to the mining history of the area. Peggy, with a vast archive of early photographs of Moriah, and an equally vast network of friends and acquaintances within the community--local historians, librarians, former miners, Mineville residents--made many phone calls and personal introductions, without which I would never have had an opportunity to meet and interview former miners and residents of the tailings block houses. Charlie served as host and expert fishing guide, helping to keep my husband busy fishing while I spent days in the Essex County

archives, or photographing the tailings block houses.

The Porters introduced us to Julia Hammond, who provided fantastic breakfasts and a comfortable bed, conveniently located near Mineville, between Port Henry and Elizabethtown. Pat Farrell, Bob Brennan, the Grays and the Martins, all provided invaluable information about Mineville's history and the tailings block houses. Pat Farrell provided an introduction to Joe Java, who supplied me with samples of tailings block. Jim Kinley and Mary Bell at the Essex County Historical Society were extremely helpful, allowing me free use of the museum copy stand as I pored over their map and photograph archives, and introducing me to Bill Johnston, director of the Essex County Planning Office. Bill generously shared with me the draft manuscript of the August 1989 <u>Reconnaissance Level Survey of Historic Resources in the Town of Moriah, New York</u>.

Thank you to Sam Harris and John Milner for being the first ever advisor and reader-by-correspondence, to Seth, Inge, and Davi-Linda for giving me occasional pushes, and to Gladys for keeping Sophie happy and healthy and out of the study.

CHAPTER I: INTRODUCTION

The Significance of Mineville's Tailings Block Houses

The tailings block housing of Mineville and its sister village of Witherbee, built between 1903 and 1910 by the Witherbee-Sherman company, were a unique development in the design history of company housing. Built to house both miners and the mine's mid-level managers, the tailings block houses were built in a variety of sizes and shapes, ranging from block-like multifamily tenements to single-family, gambrel-roofed cottages. The houses were distinguished primarily by their construction material: a concrete block made using the by-product of iron ore extraction as the aggregate. The use of this recently developed building technology, hollow concrete block, in the Adirondacks, where wood-frame construction naturally predominated, is a phenomenon worthy of study. In the study which follows, we will examine this choice of tailings block over wood, by comparing Mineville's tailings block houses to contemporary company housing developments.

Although concrete block was manufactured for several decades prior to the construction of Mineville's tailings block houses, its appropriate use in domestic vs. industrial construction was the subject of fierce debate.

Contemporary trade literature often published letters to the editor from architects and concrete manufacturers, criticizing or promoting the use of concrete block in domestic construction. Poor quality control in the manufacture of block was seen as the major stumbling block to its acceptance as an appropriate domestic building material. Aesthetics were also a concern, and many articles were devoted to methods of improving the appearance of concrete block.

Although much space in trade journals was devoted to the aesthetics of concrete block, enlisting architects as promoters of the material, the more fundamental concern of the trade journals was clear: to push concrete as an accessible building product, one which required little in the way of specialized knowledge or equipment to manufacture or to use. The journals appealed to the high and low end of the real estate markets at once: simple industrial buildings and small workers' cottages of concrete were highlighted with the same frequency as churches or large suburban homes. Within this spectrum, the tailings block houses of Mineville rank somewhere in the middle. As our survey and description of twenty-five of the tailings block houses will show, the builders of Mineville's tailings block houses made conscious attempts to vary the appearance of the tailings block, even in the

humblest of multifamily tenements. The block was manufactured on-site, at the separator shaft which was the source of aggregate, by workers with no previous experience in the manufacture of concrete products. The houses were constructed by workmen of varying expertise in masonry construction, and as our examination of the present condition of the houses will show, by builders experimenting with the material to achieve decorative effects, with varying levels of success.

The tailings block houses are significant as a monument to a developing building technology. Their construction: for the most part without steel reinforcement, employing experimental decorative techniques, expresses the ultimate in vernacular concrete block construction for the period 1903-1910. Aesthetically, the tailings block houses compare quite favorably with other workers' housing illustrated in Concrete-Cement Age between 1912 and 1914, the first years for which an index is available. In the realm of contemporary company-supplied workers' housing, Mineville's tailings block houses also compare favorably with other workers' housing, but particularly well when compared with concrete company housing. Just after the construction of the tailings block houses, in 1912, a "concrete city" was constructed by the Delaware, Lackawanna and Western Railroad company at Nanticoke, Pennsylvania,

a small town located in the center of Luzerne County, ten miles southwest of Wilkes-Barre on the Susquehanna River. This company town of poured concrete houses, built to house coal miners and their families, was touted in both building and industrial trade journals as a prototype of the modern company town.[1] With its spare, undecorated, unfinished exteriors and interiors--praised for the ease with which they could be flushed out with hoses to fumigate the houses between occupants--the Nanticoke development makes the tailings block houses, particularly the detached homes of similar size, appear warm and luxurious by comparison.

A Technological Assessment of Tailings Block

The use of iron ore tailings as aggregate is the one feature which distinguishes the block houses of Mineville from contemporary block construction. The use of aggregates other than gravel or crushed stone and sand is mentioned in contemporary trade journals, but it is never made clear that the choice of aggregate is dictated by availability. For the Lackawanna houses, coal cinders were mixed with sand to create the concrete mixture. The cinders were criticized for producing concrete of poor compressive strength, necessitating the use of more cement, but its ready availability presumably outweighed the additional cement costs in the case of the Lackawanna

housing.

Blast furnace slag, employed by railroads and roofers during this period as ballast, was another material readily available to the allied iron, steel and railroad industries. The slag was praised for producing concrete of light weight and superior compressive strength.[2] Iron ore tailings, also a by-product of the iron and steel industry, likewise produced concrete of superior strength; a 1:5 mixture of cement:tailings block was praised as at least equal to coarse sand, being equal in compressive strength to a 1:3 mixture of cement:fine sand.[3] Unlike slag, however, the use of tailings increased the weight, and therefore the labor cost, of concrete construction. Ultimately, the engineering assessment of a particular aggregate was much less important than its low-cost availability. The iron ore tailings were absolutely free to the mining company, requiring no special loading or transportation to the site of block manufacture. The fact that the tailings, already crushed and graded as part of the ore extraction process, cost nothing to the mining company offset any additional labor cost due to the weight of the resultant block.

The choice of iron ore tailings was more an economic one than a choice dictated by the technical advantages of

tailings over more conventional aggregate. However, the increased strength and weight of the tailings block over conventional block has had one unforeseen, and ironic, result. The tailings block houses of Mineville have proved almost invincible to demolition, or even alteration. Built as housing for miners at a time when the iron ore was already half exhausted, the tailings block houses of Mineville have long outlived the mines themselves.

CHAPTER NOTES

[1] "A City of Poured Houses: Model Dwellings for Wage Earners," Scientific American Supplement No. 1895 (April 27, 1912), 260; Frederick Squires, "Progressive Architectural Construction," Architecture and Building 46 (June 1914), 233-5.

[2] W.A. Aiken, "Slag as an Aggregate in Concrete," Railway Review (August 15, 1914), 199-200, publication of paper read before the 17th annual meeting of the American Society for Testing Materials, Atlantic City, N.J., June 30-July 3, 1913.

[3] Oswald C. Hering, Concrete and Stucco Houses: The use of plastic materials in the building of country and suburban houses in a manner to insure the qualities of fitness, durability and beauty, (New York: McBride, Nast and Company, 1912), 15.

CHAPTER II: HISTORY OF MINEVILLE, MORIAH, NEW YORK

Iron Ore Mining and Settlement in Moriah, 1808-1876

Mineville is what one would expect: a mining village. Today, Mineville and the nearby village of Witherbee are referred to collectively by local residents as Witherbee-Mineville. These company towns are a monument to the mining industry which dominated this region from the mid-19th century through World War II. The mining companies responsible for the construction of these communities, the Witherbee Sherman Corporation and the Port Henry Iron Ore Company, failed and dissolved in the 1930's. Their successor, Republic Steel, pulled out of these communities, beginning in 1957. These companies left behind only their namesakes--the two small hamlets of company-built houses--and a 14 million ton mountain of tailings. No industry has stepped in to replace the once dominant mining companies. The communities struggle on, nestled in a valley, in the shadow of the "tailings pile," as it is known.

Mineville is part of the township of Moriah, on the eastern edge of Essex County, in the center of the Adirondack region. The population center of Moriah, Port Henry,

fronts Lake Champlain, but Mineville is located about four miles inland. The road connecting Mineville to Port Henry is called Plank Road, after the road surface laid by the mining companies to aid in transporting ore to the harbor. The company-built housing of Mineville is located just off the Plank Road (See Fig. 1).

Moriah was incorporated in February 1808, carved out of townships to the north and south. Iron ore had been discovered in the area in the mid-18th century, and in 1810, Deacon Sanford, an early Moriah settler commissioned a survey which began to identify the geological wealth of the region. This survey numbered various ore beds, labeling the iron-rich land in the vicinity of Mineville Lot Nos. 21, 23, 24 and 25, which would evolve into: "Ore Bed No.21," etc. Through 1820, because fewer than a half dozen families had arrived, the area that would become Mineville remained largely forested. Other communities of Moriah were cleared and farmed earlier, however, with the overall population of Moriah growing to 1000 by 1820. The lumbering and potash-producing businesses that had cleared Moriah east of Mineville then expanded, clearing the hilly area of present-day Mineville by about 1830. The first attempts at mining the ore were not made until 1824. The first "mercantile business" was established in Moriah in 1810; previously, settlers were required to travel as far

as Albany or across Lake Champlain to Vermont for provisions.[1] Between 1820 and 1830, the population of Moriah tripled, reflecting both the established lumbering and early mining activity.[2]

By 1822, a blast furnace had been built in Port Henry, processing ore from several nearby beds into pig iron, which was sent to Troy for manufacture. In 1827, this furnace was converted to a stove works, but in 1836 the blast furnace was revived. Three years later, the furnace was purchased by Horace Gray of Boston, who formed the Port Henry Iron Ore Co. in 1840. Gray had leased or purchased rights to ore from the Cheever mine, located north of Port Henry on Lake Champlain. The Cheever mine predated the Mineville beds, reportedly providing Benedict Arnold with iron for cladding Revolutionary War ships. Gray built a second furnace in 1847, producing a total of about ten tons of iron per day. Gray's enterprise failed the same year, and his company changed hands several more times until it was acquired by Witherbee, Sherman & Co. (with others) in about 1883.[3]

Meanwhile, it was not until 1846 that miners at Bed No. 21 reached the "body of ore," thirty feet underground.[4] A modest quantity of ore, about one thousand tons, was mined between 1846 and 1853. In 1853, the American Mineral

Company built a processing plant in the area of Mineville, to separate phosphates, or apatite, from the ore. The American Mineral Company planned to export the resulting mineral to England.[5] An 1858 map of Essex County indicates the American Mineral Company, along with their three separators (See Fig. 2). This map also outlines the area of Mineville, but designates only individual structures and their owners, indicating that the name "Mineville" was not yet in use. The American Mineral Company did not long survive their appearance on the 1858 map. After significant investment, the company's use of a "crude magnetic separator" failed to extract phosphates pure enough to be sold as fertilizer. In the early 1860's, mining operations were assumed by the Port Henry Iron Ore Company.[6]

Between 1820 and 1860, various ore beds in the vicinity of Mineville changed hands approximately every ten years, with investors consolidating holdings. Along with the Port Henry Iron Ore Company, Witherbee, Sherman & Co. emerged as major shareholders in Ore Bed 21. The two companies shared board members in common, creating a dynasty which would dominate the development of Moriah for the next sixty years. Writing a history of Essex County iron mining in 1906, Frank S. Witherbee called the period 1860-1870 the "height of iron mining in the County."[7] Actually, growth

of this mining community peaked in 1880, when Essex County was the second-ranking iron producing region in the country, and the Sanford Bed at Mineville was the fifth most productive iron ore mine in the United States. Also in 1880, the region ranked first in the nation in the production of bloom iron, the soft iron used to make wrought iron, producing 84 per cent of the national output of this commodity. According to census data, Moriah's population reached its apex in 1880 at 7,379.[8]

Ironically, 1880 also marked the beginning of the end for Adirondack iron production. Valerie Rosenquist, in "The Iron Ore Eaters," explains that "bloom iron demand shrank nationally as Andrew Carnegie and his followers rapidly and consistently developed ways to use lower quality ore to make higher quality steel."[9] Slow to adopt this new technology, the Witherbee Sherman Company continued to transport their high-quality ore to Albany or Pittsburgh steel manufacturers, and were thus more susceptible to market fluctuations and competing steel corporations with more integrated operations.[10] After the 1880 peak, Moriah's population, along with its iron production, declined gradually, numbering 5,124 in 1980.[11]

Although Witherbee does not mention it, the rapid growth of Mineville in the 1860's and 1870's was no doubt due in part

to the industrial demands of the Civil War. Railroad development during the same period sustained this boom in iron production. A county atlas of 1876 indicates that the population of Essex County doubled between 1860 and 1875, from a population of 3,466 to one of 7,898, about 1000 of whom are listed as employed by the county's six mining companies.[12] A large proportion of these workers, 250 to 300 in 1869, were employed in or around Mineville, on Ore Bed 21 and the adjacent beds, No. 23 and No. 24. Winslow C. Watson, author of an 1869 county history, commented on the "quiet, discipline, and regularity" of the mine workers, concluding: "It is said that laborers prefer a situation in these mines to toiling on a farm or in lumbering occupation."[13] It is ironic that these cheerful workers had not yet had the benefit of company housing.

The 1876 Atlas is the first published map to use the name Mineville. This Mineville map shows two active mines at the center of town, several stores to the west, a church, a school, and a hotel. In addition, the map indicates approximately seventy individual buildings or lots, including both homes and mining structures (See Fig.'s 3 and 4). The Atlas includes illustrations of important homes and institutions, including a Roman Catholic church, St. Peter and St. Paul, located in Mineville (See Fig. 5).

Also illustrated in the Atlas is the residence of J.G. Witherbee, not located near his mines, but situated on the more genteel lakefront lots of Port Henry, the commercial center of Moriah. The Atlas also depicts a commercial building, located in the center of Port Henry (See Fig. 6). This large commercial block, Lee House, was no doubt built by John A. Lee, an early partner of George Sherman and S.H. and J.G. Witherbee, whose mining firm was formed in 1851. In 1862, the Witherbees bought Lee's interest in the firm, creating Witherbee, Sherman & Co. Unlike Lee's prosperous brick commercial block in Port Henry, the Mineville buildings illustrated in the Atlas, including the simple Gothic church and the nearby Italianate rectory and barn, are of wood. This wood church, built in 1870 in a simple style more typical of 1840 than 1870, was abandoned as mining operations shifted, and a new brick church was built to replace it in the northeast corner of Mineville, at the intersection of the Plank Road and Bartlett Pond Road.

Witherbee Sherman Company's Housing Construction, 1870's-1918

As Mineville grew, stores, hotels, churches and schools were built to service the mining community. A general

store was established by G.T. Treadway in 1866. Treadway apparently purchased the store from the Port Henry Iron Ore Company; various mine owners had operated some kind of store, from the inception of mining operations at Ore Bed No. 21. From 1866 onwards, however, the mine owners were no longer involved in selling merchandise to their employees. A second privately operated store, Alan & Sherman, established a branch of their Port Henry store in Mineville in 1880. A third store, owned by Charles A. Butler, was also established in the 1880's, selling tinware and other home furnishings. Additional independent establishments included Empire House, a hotel, built by Dennis Hayes in 1873, and Cusal's House, another 1873 hotel, fronting "Union Square."[14] The 1876 atlas indicated a third hotel proprietor, J. Keough.

It is possible that one or more of these hotels served as boarding houses for some of the three hundred miners who arrived during the boom period of the 1860's-70's; perhaps for the mine's managers. Certainly, the rapid increase of Mineville's population during this period strained existing housing resources. The mining company responded with its first housing for workers in the 1870's. This housing was built near present-day Mineville, particularly on "Tracy Hill." Houses were of wood frame construction. This housing is not distinguished from other structures in the

1876 Atlas, so it is difficult to offer detail about appearance, size, or occupancy. One contemporary observer of Mineville offers this insight into its appearance:

> The churches, houses, and public buildings are built anywhere and everywhere, back to back, sides to fronts, at all angles to the roads or streets, and with the carelessness of <u>structures temporary</u>. The experience of a decade [1875-1885] has shown the villagers that at any moment it may become necessary to seek a living elsewhere, which has bred a consequent disregard of solidity, comfort, and neatness. There is a griminess and roughness over the whole place, and not even the gorgeous summers of the mountain can hide them.15

These wooden houses would eventually be replaced, beginning with a mining expansion in the early 1890's, just before the 1893 Depression, and in the interim, were allowed to decay. Only eight of approximately thirty workers' houses built by the Port Henry Iron Ore Company c.1865-70 survive; all of wood-frame construction and significantly altered, located on Broad Street, Curtis and Maple Avenues. Twenty more two-story, clapboard, two-family houses survive, built by the Port Henry Iron Ore Company c.1870 to the northwest of the Mineville houses, in the area which would become Witherbee. Approximately thirty examples of earlier, modest, vernacular wood-frame workers' housing, built privately in Mineville c.1845-65 survive. These include one and one-half story single-family homes and two-story boarding houses, located in the residential area on and

just to the west of the Plank Road, between Broad Street or Hospital Road to the north and Joyce Road to the South.[16]

By 1880, Mineville supported three churches: two of wood; a Presbyterian church, built on the Plank Road in 1875, and originally Congregational; Emmanuel Mission, an Episcopal Church, built in 1879; and the Roman Catholic Church, Sts. Peter and Paul, which was the brick predecessor to an earlier church of 1870. Although its population demanded three churches, the Presbyterian church had to share its minister with a Port Henry congregation, while the Episcopal and Roman Catholic congregations were subsidiary to Port Henry parishes. This lack of full time pastors might indicate either a lack of funds or a lack of trained ministers willing to brave Adirondack winters, but was primarily a result of the secondary status Mineville held in relation to the neighboring hamlets. Despite the fact that Mineville's population exceeded that of Port Henry from the 1820's through the 1870's, the poverty of the mineworkers, dependent for employment on the volatile iron market, precluded its establishment as a separate parish.[17]

By 1892, the "permanent" population of Witherbee and Mineville had grown large enough to support a new public school. A public school had been established twenty-five

years earlier in the more residential and mercantile population center of Port Henry, while small district schools were also run from the 1860's at the Cheever Mine, at Lots 21 and 24 in Mineville, and other locations, established within a total of fifteen "districts" throughout Moriah. The school established in 1892 and chartered a year later was part of an effort on the part of the district school boards--dominated by Witherbees and Shermans--to centralize, eliminating some of the scattered district schools to increase efficiency.

The Mineville and Witherbee Union School was chartered in 1893. Eventually, the Witherbee Sherman Company would build a ten-room, concrete building to house the school. Initially, classes were held in an existing meeting hall.[18] The establishment of a public school in Mineville coincided with the second expansion period in mining operations. During this period just before the Depression of the 1890's, the company recruited immigrant laborers, Italian and Eastern European, many of whom arrived in Mineville with their families. In addition to the new school, new housing was needed to meet the needs of this immigrant population.

Just preceding the arrival of new immigrants in the 1890's was the failure of the Cheever community, the mining

operation located just north of Port Henry which had seen activity since Revolutionary War days. From the 1840's onwards, Cheever, which was owned and operated independently of the Witherbee-Sherman interest, provided a home and source of employment for hundreds of Irish immigrants. When Oliver Presbrey, owner of the Cheever mines in the 1880's and 1890's, failed in his efforts to interest either Witherbee Sherman or other regional iron mining companies to enter into partnership with him, in order to provide distribution contracts and capital investment, he was forced to shut down operations completely. Skilled, second generation Irish miners, along with second generation Irish merchants who provided services to the Cheever community, were forced to abandon a ghost town of sixty tenements, ten years before the 1893 Depression. Many of the miners would become managers for Witherbee Sherman, and occupy the some of the nicest of the company housing which would be built in the first decade of the 20th century. A few of the merchants would establish branches of their Port Henry stores in the rapidly expanding residential community of Mineville, providing goods to the new waves of Italian and Eastern European immigrants.[19]

In 1896, the Witherbee Sherman Company issued a "Report on Facilities," containing an inventory of company-owned

buildings. In addition to those buildings directly involved in mining operations, the facilities included a barn, a warehouse, a sawmill and a carpenter's shop, all of red brick, with metal roofs. Over the next twenty years, company carpenters would be employed in the construction of worker's housing, in addition to their work on the mill buildings housing mining machinery.[20]

As a result of the 1893 Depression, the population of Moriah dropped sharply between 1890 and 1900: from 6,787 to 4,447. When the mines curtailed production, not only miners, but tradesmen and other secondary producers were forced to leave the area to look for work. However, production was again expanding by the late 1890's, and by 1910, Moriah's population had climbed back to at 6,754.[21] Apparently anticipating a period of sustained growth following the 1893 Depression, the Witherbee Sherman Company had constructed tenements to house 84 workers by 1898. These tenements were all of wood, and most were double tenements, with four or five rooms for each family. The Port Henry Iron Ore Company, by now just a stock-holding entity of the Witherbee Sherman Company, "owned" additional tenements.

In 1900, the Witherbee-Sherman Company underwent reorganization, as the Lackawanna Steel Company acquired

the Sherman interest, along with the now bankrupt Cheever mines.[22] Between 1900 and 1910, as mining operations again expanded, profits from ore sales were channeled into the construction of new housing for immigrant workers. By 1914, company housing had grown to 238 tenements, housing six hundred working men and their families. Writing about Mineville housing in 1915, chief engineer S. Lefevre described the company as "in the same position as the old woman who lived in the shoe." Those workers with families had then over a thousand children, five hundred of school age, necessitating an additional classroom and teacher, on average, each year.[23]

In 1905, a tenement was constructed to house 60 Italian immigrants, all male employees of the mine. The company followed a practice of segregating workers by race and nationality. Lefevre describes this practice matter-of-factly in his 1915 article:

> Houses have gone up a few at a time wherever a clear space could be found and the slopes were not too steep. This has its advantages, as it separates the dwellings into various groups, which makes it possible to segregate the different nationalities; thus we have an an American quarter, an Italian, and a Polish-Slavish-Hungarian district.24

In part, the mining company is recreating a contemporary urban pattern of ethnic neighborhoods, where immigrants of like backgrounds dwell in their own small communities. In

addition, immigrant families living together performed a recruitment function for the mine:

> Each family is a recruiting center, for when more men are wanted, they write their friends to come and get work and board with them.25

What is not mentioned in Lefevre's article is that Witherbee-Sherman actually set up a padrone system, paying a family of Italian immigrants who had arrived in the 1890's to recruit Italian labor in New York City. Eventually, this system, which elevated earlier immigrants over newer ones, contributed to the labor unrest which resulted in strikes in 1913.[26] By then, the padrone system had become widespread graft, practiced and abused by members of all immigrant groups, with petty bosses requiring payoffs before granting new jobs, or threatening to fire workers unless a certain payment was received.[27]

Whether they were recruited through the padrone system, or arrived in Mineville by their own means, it is understandable that single male immigrants would prefer to board with friends and family than to live in the five large boarding houses, each accommodating fifty men. Families living in two or four family tenements, with three or four bedrooms, took in as many as five or six boarders. This meant that workers boarding with families were actually more crowded than those in the three story,

thirty-bedroom boarding houses. Families with boarders must have compensated for this by offering better food, a less institutional atmosphere, and perhaps, lower rent. At the time Lefevre was writing, 1914, the large boarding houses were rented by the mining company for $25/month to two families, who in turn operated the boarding house and collected rent for their services. Renters of each unit of the four-family tenements, in contrast, were charged $5.50/month.[28]

It is probable that the immigrant mine workers arrived unskilled, and therefore were restricted to the more laborious, lower paying jobs. This may explain why the multiple family dwellings were reserved for foreign workers, while single family houses, with front lawns and gardens, were the domain of "American families." Rental rates were calculated based on number of rooms per house, with single-family houses renting for $8 or $9/month in 1914, or about one and a half times the cost of the four family tenements.[29] Lefevre, writing for an audience of mine owners and managers, noted proudly that each tenement was separated by a space of thirty to forty feet, had a small flower garden for each family, and one or two double barns with "accommodations for a cow, chickens and a pig," and privies "built in a corner of the barns." Lefevre concludes:

> This general arrangement avoids a nondescript collection of shelters in each back yard. Prizes given for the best-kept lawn, flower bed, and window box have stimulated interest and pride in appearances, and have added greatly to the attractiveness of the village.30

In the trade literature of company housing, house to lot ratios, sanitation, and appearance were preoccupations. In an era of epidemics, industry leaders took care to distinguish their company housing from squalid urban tenements.

It was not just the threat of epidemics which stimulated the Witherbee Sherman Company to provide new housing, gardens and other amenities to its workers c.1910. Like many other industries during this period, the Witherbee Sherman Company was subject to intense scrutiny by the New York State Labor Department. Valerie Rosenquist writes that in the period just following the devastating Triangle Fire, both the state and local labor organizations were compelled to develop and campaign for minimum health and safety standards. Because iron mining was one of the most hazardous occupations in the country, with employment of unskilled immigrants, its use of explosives, danger of cave-ins, and occupational lung diseases, it invited more careful study than other industries. In 1912, after being targeted by labor organizations, newly organized local

unions in Mineville threatened a general strike. As part of the state mediation which followed, the State Department of Labor sent an inspector to Mineville to conduct a survey of housing conditions.[31] She found conditions overcrowded, due to the number of boarders kept by many families. She found that outhouses were under-maintained and "vile," that "livestock, such as cows, pigs, and chickens, were allowed to roam about at the very doors of homes," that the water supply was inadequate and inconvenient, and that "garbage and refuse was gathered in heaps around the kitchen doors."[32] When the state published this report in 1913, the Company responded positively, with the results, if not the stimulus behind improvements, summarized in Lefevre's 1915 article on sanitation at Mineville.

Mineville housing may have been kept tidy and blooming through the company's incentives program, but a lack of accessible running water meant that very few homes were built with indoor plumbing. Lefevre's article detailed the obstacles to installing a sewer system: lack of an available stream or reservoir as water source; prohibitive expense of burying sewer pipes in a valley covered with "a combination of boulders and hard pan;" and the scattered location of the housing over four miles of streets.[33] Instead, the company established a system for the

collection and incineration of wastes, costing about 1$/tenement per month to operate. Custom-made, sealed privy boxes were collected weekly by horse and wagon, and their contents burned in a central incinerator. Refuse lumber from the company sawmill, including concrete forms left over from housing construction, fueled the incinerator. The company also installed several concrete septic tanks. Twenty-one homes did have indoor toilets and baths; presumably, these were the same homes that employed septic tanks. Those homes with indoor plumbing included at least one of the large, fifty-men boarding houses, in addition to several of the nicer one-family homes. The cost of installing the plumbing and fixtures for an indoor washroom and laundry, as well as steam heat, was $1000, while construction of the entire boarding house, minus plumbing, cost only $4000.[34]

Of the 238 tenements owned by the mining company in 1914, 88 were of concrete block. Of these 88, approximately 50 were built between 1903 and 1906. The remainder were built by 1910. The use of tailings block lasted only seven years, but during that time eighty-three one, two, and four family structures, and five large rooming houses were built. Each of the rooming houses was designed to house as many as fifty men (See Fig. 7). In addition to their use of concrete in company housing, the mining company also

used the relatively new and experimental building technology of "monolithic reinforced concrete" in the construction of an electrical power-house in Port Henry, and in the company office building and school in Mineville (all built from 1903 to 1906).[35]

Not all construction during this period was of concrete, however. In 1906, the Witherbee Sherman Company built Memorial Hall, a large, shingle-style building with a random-coursed stone base, as a memorial to the Witherbee family. Memorial Hall functioned as a sort of settlement house, with recreational facilities and meeting rooms for the use of mine workers and their families. The state Labor Department inspector who surveyed Mineville in 1912 reported that "no social activities had been undertaken of any value or interest to the foreigners, although a large hall for social activities was available."[36] Although company provided the hall, they did not immediately provide the means to fill it by providing money or instructors for either social or educational events or classes.

The new school, also constructed in 1906, was located next door to Memorial Hall, and was of reinforced slab, rather than concrete block construction. Also adjacent to Memorial Hall, the company constructed a "lock-up" of tailings block, with an attached residence for a

company-paid policeman.[37] Presumably, this jail was used to isolate workers who were drunk and disorderly, or who had committed other minor offenses.

The other buildings constructed in 1906, all of tailings block, provided housing for immigrant labor: a "Hungarian Boarding House," located across from the Change House, on West Street in Witherbee, near the mine itself; and six detached houses, on the west side of Norton Avenue (now Bridal Road). The Change House was literally where the miners changed their clothes; it was an open shed lined with lockers, and was also constructed of tailings block.(See Fig. 8)[38]

Construction of tailings block housing, designed by company engineers, continued in 1907-8. Seven homes, all five-room, gambrel-roofed, single-family houses, were built on the north side of Joyce Road. On the south side of Joyce Road, two double tenements were built. On the north-south road connecting Joyce and Wall Streets, five more single-family houses were built. On one corner of this connecting road, a seven-room house was built. The tailings block used in these homes, manufactured by the mining company, was produced in both rough and smooth-faced blocks. Roofs were of slate. Many of the less luxurious, four-family homes, almost exclusively reserved for foreign

labor, were located a mile west of Mineville, in Witherbee, on Barton Hill. A few more elaborate houses were designed for department heads, including an L-shaped, six-room house with an elaborate front porch, facing Plank Road, and immediately next door to the south, a double house built for Mine Superintendent Alvin Cummings and his elderly father. The Cummings house was divided down the middle, with rooms arranged symmetrically on either side. In addition to these homes of tailings block built between 1907 and 1908, three houses of wood-frame and stucco construction were built on Wall Street (in 1907) (See Fig. 9).[39]

In about 1910, tailings block housing construction resumed with the building of several two-to-three family houses, all double gabled, on Wasson Street in Witherbee.[40] These houses marked the last use by the mining company of tailings block for housing construction.

In 1910-12, a sixteen-bed hospital was established in an existing red-brick building, the former blacksmith shop, dating from the 1870's. The mining company offered heavily subsidized surgery and hospitalization to its employees (typical room and board, \$2/day). Because transportation to Burlington, Vermont, or other "nearby" hospitals was not yet practical during this period, the hospital was a

necessity, and not mere paternalism.[41] The hospital also performed a community health function, sending a trained nurse on welfare visits. The nurse would report to the company any unsanitary conditions or cases of illness found, and provided advice to workers' families on the care and feeding of infants and children, as well as other health issues.[42]

In 1913 and 1914, there was no new housing construction but the Mineville community did face several crises, including a miners' strike, and several fires.[43] The causes for the strike are detailed by Valerie Rosenquist; ironically, housing conditions were improved by the company in 1913 in response to a threatened strike in 1912, but the workers struck anyway as the company failed to meet demands for improvements in wages, worker safety, shorter hours, and the elimination of institutionalized graft. The company acted brutally to crush the strike, evicting union leaders from their new company-built, company-owned homes in the midst of the Adirondack winter.[44] The fires were related to the labor unrest. The first fire, in June of 1914, was described in local papers as having been caused by a spark from the stack of a mine shaft; within a half hour of the discovery of the fire, two separators, the shaft house, and a cobbing plant were destroyed. The company was insured against this $300,000 loss, but production was severely

hampered while rebuilding was underway.[45] As described by Valerie Rosenquist, however, "selected company buildings" were burned in the summer and fall of 1914 by newly arrived Italian immigrants, members of a local Black Hand group, which actually met in the company-provided facilities of Memorial Hall.[46] This arson was a protest against working conditions which had not been improved by the strike.

A second, unrelated fire took place in September of 1914 in Mineville's commercial center, destroying several stores. The local paper called the fire "the most destructive conflagration in the history of Mineville," but must have exempted the fire at the mine itself, since damage was assessed at $75,000.[47] A clothing store, a wholesale cigar store, a jewelry store and a barber shop, all owned by immigrant merchants independent of the mining company, were lost, but firemen were able to save nearby housing from damage. This fire may have been a result of arson as well, a protest by the have-not workers of the Black Hand against the now-prospering earlier immigrants.

The severity of these two fires should have confirmed mine executives reliance on the fire resistance of tailings block, much touted in the trade literature at the time of their construction. Instead, the housing built in the

years immediately following these fires was of wood frame construction. There is a store extant in Mineville, fronting Plank Road, built independently from the mining company. The two-story, post-office/store, with residence above, was constructed c.1910-20 entirely of tailings block, but it is not clear whether it was built before or after the 1914 fires.

In 1915-16, a company-built High School was established, augmenting the existing elementary-eighth grade school established twenty years earlier. In 1917-18, the Witherbee Sherman Company resumed housing construction, building two single-family and approximately six double-family houses built on Park Street. Like the homes built on Wall Street in 1907, these new homes were of wood-frame construction with wooden shingle or stucco exteriors. These houses were designed for administrative or managerial staff. The dead-end road on which they were built was provided with a grass strip down the center, distinguishing Park Street houses from earlier workers' housing (See Fig. 10).[48] The construction of these homes marked a third period of increased production, stimulated by World War I. These were the last homes built by the company until a fourth period of booming production which would arrive with World War II.

Chronology of Decline of Witherbee Sherman Company, and Iron Ore Mining in Moriah, 1924-195

Much of the early success of the Witherbee Sherman Company had been due to a prudent investment in new technologies. In the 1850's, Witherbee, Sherman & Co. began experimenting with the new technology of magnetic separation for refining magnetite ore. Thomas F. Witherbee, partner in the mining company in the 1860's, was among the first furnace managers in the United States to employ a chemical laboratory in the regular operations of his blast furnace. In 1870, the company was among the first in the United States to adopt a closed top on its blast furnace, adapting the stack and tunnel of its Fletcherville blast furnace for the use of anthracite because it was readily available. The company lapsed in its search for new refining technologies in the late 19th century, relying instead on its dominant position in national iron production of the 1870's and 1880's. By the time the company returned to investing in new technologies, they had lost their market dominance. In 1915, while facing fire losses and labor unrest, the company completed a new concentrating plant which was the largest of its type ever built, with a capacity for treating 1400 tons of crude ore in nine hours.[49] It was

this revived willingness to invest in new technologies that facilitated the construction of tailings block housing at Mineville, but the capital improvements of 1915-1925 occurred to too late to recapture market position lost to Carnegie and the national steel monopolies.

In the 1920's, Louis Francis, who had married into the Witherbee family, was president of the Witherbee Sherman Company. In 1924, Francis borrowed heavily to build a new blast furnace, to replace outdated furnaces built by the company years earlier in Port Henry. Following this expenditure, the company could not meet its tax obligation, nor support its debts, as the furnace did not prove cost effective.[50] Over the next decade, this poor investment sent the Witherbee Sherman Company into an irreversible decline, accelerated by the onset of the Depression.

By the mid-1930's, the Witherbee Sherman Company, which had managed to rule the mining company dynastically for over seventy years, had failed, and was placed in receivership. In 1937, the Republic Steel Corporation stepped in, leasing Witherbee Sherman holdings from the Bank, first for twenty-five years, then extending this to forty years, and finally acquiring the company outright. With the arrival of Republic Steel, the Witherbee/Sherman families withdrew; there were no heirs involved in mining operations from the

1930's on. The transfer of management in 1937 included the gradual transfer of all company-owned housing deeds from Witherbee-Sherman to Republic Steel.[51]

By 1942, Republic Steel owned all Witherbee Sherman housing, then totaling 470 employee dwellings in Mineville, Witherbee, and Port Henry. The average rent in 1942 was $10/month,[52] which still represented a subsidy to workers. With lucrative government contracts and a war-stimulated production boom, Republic Steel added to this housing stock, constructing an entirely new community of spare, wood-framed bungalows in Mineville, dubbed Grover Hills. Houses were sited much closer together than the earlier, ad-hoc housing construction had allowed, making the provision of services easier. By the mid-forties, after nearly twenty years of hard times, the older Mineville houses were considered barely habitable by the new workers recruited to meet the war-time expansion in production. Evidence that the company failed to maintain its turn-of-the century workers housing is found in this remembrance by a miner's wife:

> We moved into one of the company houses in 1944. It had originally been a boarding house, and then a four-family house. The section of the house that we rented was only two rooms. The upstairs was used for storage by another family, the same family that was raising chickens in the part we rented. I don't think the company knew about it. What a mess. All the old flooring had to be torn up and I scrubbed

> and bleached the boards underneath. It was a poorly insulated, run down dump. The company offered us the use of the upstairs, but we moved out.[53]

As World War II stimulated production, housing needs once again exceeded supply, and two or three families were crowded into space intended for one family. The never popular boarding houses were subdivided into four-family tenements. Lefevre's strict sanitation rules regarding livestock were abandoned, and no care was given to the maintenance of the tailings block houses. Instead of renovating its existing, turn-of-the century housing stock, upgrading systems, and providing general maintenance, the company seems to have adopted a policy of abandoning it in favor of new, smaller wooden houses. A new community of company housing, Grover Hills, was constructed southeast of Mineville, just off the Plank Road. Of course, the company continued to rent out space in the older houses when it could.

By the mid 1950's, Adirondack magnetite mines were reaching a depth at which it was no longer very profitable to operate them, particularly in comparison to newer mines in the Lake Superior region. Republic Steel, in the beginning of a gradual withdrawal from the region, began to curtail its operations in Mineville, and elsewhere in the region. In 1955-6, Republic Steel sold all of its company-owned housing, along with building lots, to the Mineville Housing

Co., a real estate corporation owned by the Galbreath family. The Galbreaths were, according to former mine supervisor Patrick Farrell, "an outfit that travelled around the country, buying up company-owned housing, and turning it over to tenants or other buyers for a profit. Originally, Republic Steel was going to sell the housing itself; instead, Galbreath's Mineville Housing Company, Inc. sold them for a lot more than Republic Steel would have asked for them. Many mining employees were surprised at the cost." The Galbreaths also bought housing at Lyon Mountain, another Adirondack iron ore mining company, from Republic Steel.[54] The Galbreath Company did in fact specialize in the disposal of company town properties across the country. Based in Columbus, Ohio, John W. Galbreath and Company was heralded in a 1958 article for turning "company towns into home towns." At Morgan Park, a U.S. Steel Corporation company town in the Lake Superior mining region, buyers of company houses in 1942 voiced complaints about the Galbreaths similar to those made by Mineville residents. In Mineville, the Company had ceased to provide routine maintenance of company houses during World War II, ten years prior to the sale of the houses to residents, so Mineville residents were angry mainly over price gouging. In Morgan Park, the buyers were unprepared when the Galbreaths promised but failed not only to maintain their houses, but to provide services like snow

removal and heat and light to public buildings.[55]

Sale prices for the Mineville houses varied widely, from $500 to $5200, with an average price of about $3000. The variety can be accounted for by differences in size and condition of the houses: a double tailings block house fetched the highest price; but since the houses were sold primarily to resident mine employees through competitive bidding, prices also reflected the ability and willingness of various residents to pay for them. The average price of a company home in adjacent Witherbee was much less than in Mineville, or approximately $1400, because the majority of Witherbee homes were the multiple-family residences built in close proximity to the mine itself.[56] Community resentment was engendered by the fact that after years of providing subsidized housing as a benefit, the company had not protected its long-time employees from real estate gouging. Many of these employees had raised several generations in the same house; company housing had become family homes. Barbara Denton, who grew up in the community, wrote in 1981:

> By selling the houses, the company relinquished one of its more unprofitable obligations, leaving the responsibility of maintenance and desperately needed remodeling to the individual owners. These houses were once valuable because they were close to work, but when the industry shut down, the houses lost their...value.57

Republic Steel followed its sale of company houses almost immediately with a severe curtailment of mining operations at Mineville. Although some mining continued through the mid-1960's, the company employed successively fewer and fewer people, down from a peak of three thousand employees during World War II. The increasing depth of the mines over the years increased the cost of transporting the ore to the surface. Open pit mining, common elsewhere in the country, provided cheaper ore, as did international sources, both increasingly exploited by Republic Steel.[58] The mines were finally closed in 1971. Since then, every five years or so, a chemical extraction scheme will be proposed to recover various minerals from the remaining tailings, and former Republic Steel property changes hands from one metallurgical corporation to another.[59] Economic hopes are revived at least briefly in a community which in 1977 had a per capita income of $5,225.[60] No corporation, thus far, has fulfilled these hopes. One community resident with whom I spoke felt that until these hopes of a revival of mining were finally put to rest, no new long term industry would be able to revitalize this once thriving community. The ARC (Association for Retarded Citizens) began leasing or buying space in Moriah from group homes and sheltered workshops for retarded adults in the late 1970's, and is now a major employer in the town. Within the last year, a state prison

facility has been constructed in Moriah, providing a "boot camp" for young offenders. This facility does not provide as much employment or local investment as the ARC, but the young residents of the "Shock Incarceration Center" do perform work-camp duties locally: clearing brush, repairing roads. Lately, proposals have been made to develop the Lake Champlain waterfront of Moriah as a year-round resort. However, without the infrastructure--highway access, waste treatment, fresh water--to attract a developer, this isolated community of long hard winters may remain in economic limbo.

CHAPTER NOTES

[1]Winslow C. Watson, The Military and Civil History of the County of Essex, New York; and a general survey of its physical geography, its mines and minerals, and industrial pursuits (Albany: J. Munsell, 1869), 391, 395-96; and H.P. Smith, ed., History of Essex County (Syracuse:D. Mason & Co., Publishers, 1885), 566, 570-71, 577, 607-609.

[2]Valerie Beth Rosenquist, The Iron Ore Eaters: A Portrait of the Mining Community of Moriah, New York Ph.D. dissertation, Duke University, 1987 (Ann Arbor, MI: University Microfilms, 1987), 9.

[3]Frank S. Witherbee, History of the Iron Industry of Essex County, New York ([Keeseville, New York]: Essex County Republican, 1906), 1-29; Floy S. Hyde, Adirondack Forests, Fields, and Mines (Lakemont, New York: North Country Books, 1974), 147-48.

[4]Watson, 395.

[5]Witherbee, 29-30.

[6]Watson, 395-96.

[7]Witherbee, 1.

[8]Rosenquist, 9.

[9]Rosenquist, 17; from John R. Moravek, "The Iron Industry as a Geographic Force in the Adirondack-Champlain Region of New York State, 1800-1971," Unpublished Ph.D. dissertation, University of Tennessee, 1976, 118.

[10]Rosenquist, 17.

[11]Rosenquist, 9.

[12] O.W. Gray & Son, New Topographical Atlas of Essex County, New York (Philadelphia: O.W. Gray & Son, 1876).

[13] Watson, 397.

[14] H.P. Smith, 608.

[15] John Talbot Smith, A History of the Diocese of Ogdensburg (New York: John W. Lovell Company, c.1885), 339; cited in Rosenquist, 22.

[16] Patrick Farrell, Interview with Author. Mineville, Moriah, New York, 1 August 1988; and Unpublished Manuscript, "History of Iron Mining in Adirondacks from Pre-Revolutionary Times to the Present." Note: The mining company may not have built housing for workers until the 1870's, but in 1915, Lefevre describes some of the wooden tenements as dating from the 1850's (See note 23, below). It is possible that the company acquired some existing houses in addition to constructing new tenements in the 1870's; Jessica Smith, et. al., Reconnaissance Level Survey of Historic Resources in the Town of Moriah, New York, Prepared for the Essex County Planning Office, (Elizabethtown, New York: Essex County Planning Office, August 1989), 150.

[17] Smith, 608, and Rosenquist, 28.

[18] "Mineville and Witherbee Public Schools," Manuscript dated Nov. 18, 1916, Mineville Collection, Brewster Library, Essex County Historical Society.

[19] Rosenquist, 19-27.

[20] Farrell, "History of Iron Mining in Adirondacks."

[21] Rosenquist, 9.

[22] Rosenquist, 24.

[23] S. Lefevre, "Housing and Sanitation at Mineville," Mining and Metalurgy Bulletin 98 (Feb. 1915), 231-33; and Farrell, "History of Iron Mining in Adirondacks."

[24] Lefevre, 227.

[25] Lefevre, 233.

[26] Rosenquist, 72-73.

[27] Rosenquist, 51, 53.

[28] Lefevre, 235-6.

[29] Lefevre, 234, 237; and Frederic F. Lincoln, "A Concrete Industrial Village: Mineville, New York, in the heart of the Adirondack forests is being rebuilt in concrete. Wooden buildings fast disappearing. Low first cost, fire protection and small cost of repairs responsible for the change," Cement Age 9 (September 1909), 160.

[30] Lefevre, 238.

[31] Rosenquist, 45-50.

[32] Albany State Department of Labor, 12th Annual Report of the Commissioner of Labor, Albany, NY: 1913, 146; cited in Rosenquist, 50. Hereafter cited as Report of the Commissioner of Labor.

[33] Lefevre, 227.

[34] Lefevre, 236.

[35] Lincoln, 159,161.

[36]Report of the Commissioner of Labor, 146; cited in Rosenquist, 50-51.

[37]Lincoln, 163.

[38]Farrell, "History of Iron Mining in Adirondacks."

[39]Farrell, "History of Iron Mining in Adirondacks."

[40]Farrell, "History of Iron Mining in Adirondacks."

[41]Farrell, "History of Iron Mining in Adirondacks."

[42]Lefevre, 231. See Rosenquist, 61-2, for description of how this Polish-speaking, company-sponsored district nurse played a role in breaking the 1913 strike, acting as interpreter and carrying company's threats to miners' wives.

[43]Farrell, "History of Iron Mining in Adirondacks."

[44]Rosenquist, 45-69.

[45]"Witherbee, Sherman & Co. have $300,000 Fire Loss," The Essex County Republican, Friday, 19 June 1914, Keesville edition.

[46]Rosenquist, 74.

[47]"$75,000 Conflagration Destroys Mineville Stores," The Essex County Republican, Friday, 25 Sept. 1914, Keesville edition.

[48]Farrell, "History of Iron Mining in Adirondacks."

[49]Hyde, 221-3.

[50]Farrell, "History of Iron Mining in Adirondacks."

[51]Farrell, "History of Iron Mining in Adirondacks."

[52]Farrell, "History of Iron Mining in Adirondacks."

[53]Barbara Denton, "The Social and Economic Decline of a Mining Community," Undergraduate Sociology Paper, Plattsburgh State University (November 10, 1981), 11. (Based on interviews with 21 former miners and their families, among other sources).

[54]Farrell, "History of Iron Mining in Adirondacks."

[55]Arnold R. Alanen, "The Planning of Company Communities in the Lake Superior Mining Region," Journal of the American Planning Association 45:3 (July 1979), 270.

[56]Based on analysis of 60 Deeds recorded January 1, 1957, Essex County Courthouse; in Grantee indexes 343, pages 435-599, and 344, pages 9-105.

[57]Denton, 12.

[58]Rosenquist, 201.

[59]"Has Mineville Reached a turning point?," The Times of Ticonderoga, 9 September 1986.

[60]Essex County Rural Development Planning Project, "Directions for Development: Planning for Essex County in the 1980's," December 1979-December 1980; in Denton.

CHAPTER III: TAILINGS BLOCK HOUSES, 1903-1910

Survey and Description of Houses

Of the eighty-eight tailings block houses constructed between 1903 and 1910, the majority of those built in Witherbee, nearest the mine itself, were multiple-family dwellings. Witherbee was the location of the majority of Witherbee-Sherman & Co.'s industrial buildings: separator sheds, power plants, sawmills, repair and machine shops. Witherbee was also the site of two public schools and of Memorial Hall, the community center. As discussed in the previous chapter, the multiple-family tenements and large boarding houses were almost exclusively designated for immigrant workers and their families. Therefore, the small commercial enterprises and social institutions which catered to this immigrant population were also located in Witherbee. Built independently of the mining company, but nonetheless of tailings block, a commercial building on West or Back Road in Witherbee, c.1910, housed a grocer, a barber, and a cobbler. Also built of tailings block c.1910 was St. Michael's, a Roman Catholic Church, located near the large "Italian" and "Hungarian" boarding houses (See Fig. 11).

Witherbee's immigrant tenements were clustered near the mine, while Mineville's more exclusive housing was oriented along the Plank Road, well east of, and on an incline above, the mine's center (See Fig. 12). However, Mineville was not exclusively residential, but, like Witherbee, contained a mix of residential, commercial and industrial buildings. At the time the tailings block houses were completed, in 1910, Mineville was the site of the hospital and chemical laboratory operated by the mining company, as well as many privately operated establishments: two hotels, a post office and drugstore, and by 1916, a movie house. The Presbyterian Church, dating from the 1870's, was located along the Plank Road, as were a general store, butcher and barber shops, a variety store and several livery stables and auto shops. A 1916 Sanborn map shows that except for the tailings block building, built in 1909 and housing the post office, the drug store, and a barber, all of the commercial buildings were of wood (See Fig. 13).

It is likely that many of the stores and the hotel along the Plank Road in Mineville were the successors of earlier, similar establishments of the 1860's-1880's, and therefore older than comparable stores in Witherbee, which were built of tailings block between 1903 and 1914.[1] Witherbee, although home to many concrete buildings, also contained earlier, wood-frame workers' housing. Neither Witherbee

nor Mineville were industrial villages that appeared overnight; they were built over a period of many years. The tailings block buildings comprise only one chapter of an ongoing, evolving construction history.

Although the majority of buildings in Mineville and Witherbee in 1910 were of tailings block or wood, there were a few brick buildings in each community. Mineville contained the mining company's hospital and laboratory, both in brick buildings dating from the 1870's, and a Roman Catholic Church, St. Peter and St. Paul's, which was built of brick in 1872 and "remodeled" in 1882, with a bell tower added in 1887.[2] The only other use of brick in Mineville was in the construction of several engine houses operated by the Witherbee Sherman and Port Henry Iron Ore companies, which are shown on the 1916 Sanborn map but which were probably constructed prior to 1900. Two other industrial buildings, built by the Witherbee Sherman Company c.1910, combined brick with additions or wings of tailings block (See Fig. 14). This combination of tailings block with brick was also used in one residential building: a four-family tailings block tenement in Witherbee was built partially of red clay brick; but this was exceptional. In both residential and industrial construction, brick buildings were rare in Witherbee-Mineville after the turn of the century.

Size, Location, and Number of Tailings Block Houses in Study Group

All of the tailings block houses of Mineville were either one or two-family houses, and the majority of these were located on or between Wall Street and Joyce Road, just off the Plank Road. Because these homes are all within walking distance of each other, they have been selected as the study group or focus of this study. Although all but seven of these houses were built within a two year period, 1907-1908, they present a variety of styles within a few town blocks. In addition, because these single and double-family houses are more detailed and architecturally complex than the multiple-family houses of Witherbee, they present more challenging preservation issues; i.e. How can cracked decorative elements of unreinforced concrete be preserved? What original decorative and landscape elements: porch trim, door and window surrounds, and perimeter fences, for example, might be easily restored? Altogether, sixteen single-family houses and nine two-family houses were surveyed (See Fig. 15).

The twenty-five houses surveyed are all two stories in height. For the purposes of this study, the three

different types of single-family houses and the three different types of double-family houses have each been assigned a number:

> Type One consists of seven identical single-family homes, c.1907, all facing south-southeast on Joyce Road, and four identical single-family homes, all facing east-northeast on Foote Street, c.1908. These six-room homes are L-shaped in plan, with gambrel roofs capping both wings. Interior floor area measures 425 square feet on each floor (See Fig.'s 16 and 17).
>
> Type Two consists of three identical single-family homes, c.1908, all facing south-southeast on Wall Street. These six-room homes are also L-shaped in plan, with gable roofs capping both wings. The volume of these houses is listed in a 1909 periodical as "11,561 cubic feet,"[3] or slightly under 400 square feet on each floor (See Fig. 18).
>
> Type Three consists of two single-family houses, c.1908, both facing east-northeast on Foote Street; one on the northwest corner of Joyce Road, and the second on the southwest corner of Wall Street. Both are rectangular in plan, with large barn-like

gambrel roofs. These houses contain four rooms per floor instead of three, or approximately 600 square feet per floor (See Fig. 19).

Type Four consists of seven two-family homes, c.1910, three facing east-northeast on Sherman Road and three directly opposite. The seventh house is around the corner from Sherman Road, on the northwest corner of Wall and Foote Streets. Divided evenly down the middle, four of these homes feature hipped roofs, providing a full-height second story. The other three also feature full height second floors, with conventional pitched roofs punctuated by peaked gables centered in front facades. Each half of these double houses contained approximately 500 square feet of floor area per floor (See Fig. 20a and 20b).

Type Five consists of one two-family home, c.1908, facing north-northwest on Joyce Road, opposite Type One. This house features gambrel roofs and open porches at either end of the front facade, and is oriented horizontally, with most of its width oriented along the street. This double house contains approximately 600 square feet per floor (See Fig. 21).

Type Six consists of one two-family home, c.1908, facing east-northeast on the Plank Road. This house is similar in size and shape to Type Five, with gambrel roofs and open porches, but features more decorative masonry. Each half of this double house contains approximately 700 square feet per floor (See Fig. 22).

The architectural features of each of these house types will be discussed in more depth in the section which follows.

Architectural Features and Landscape Elements

Architectural Features

Monotony was a common criticism leveled against workers' housing of this period, while at the same time, concrete block was routinely rejected by architects as a structurally poor and visually monotonous material, inappropriate for residential construction.[4] Aware of the criticism of concrete block in contemporary trade literature, and perhaps of their role as innovators, Witherbee Sherman engineers made conscientious attempts to

add variety and detail to the tailings block houses. In his address to the American Institute of Mining Engineers, Lefevre wrote:

> The secret of avoiding the sameness of appearance which spoils the effect of most concrete-block structures is in selecting the materials to put in the face of the mold. If the face of one block is of moderately coarse material and the next one is all fine, when they are laid in the wall side by side the monotony is broken.5

This subtle exposure of the aggregate was just one of the methods used by company engineers to avoid monotonous concrete facades. Different block molds were used within one building: rough-faced block would be accented with smooth-faced block in quoins or string courses; gables or window lintels were laid up in tailings brick rather than block. The more important the resident, the more varied were the architectural elements employed in the construction of the house. Even within houses of one type, lined up in an unbroken row on identical-shaped lots, subtle variations occur in the addition or omission of string courses or keystones. This indicates that company engineers probably drew only schematic floor plans and elevations, leaving company masons free to embellish individual homes. Predictably, the stature of the resident was reflected in the degree to which the masonry of his home was embellished.

Housing Type One appears at first glance to consist of eleven identical single family homes, all six-room homes, L-shaped in plan, with gambrel roofs capping both wings. Closer examination reveals subtle differences, however. As originally built, the four houses along Foote Street featured attached, wood-framed privy sheds. The seven homes along Joyce Road had no attached outhouses. Privies for these homes were located in the rear barns, at least forty feet from each house. This distance would have caused considerable hardship during the long Adirondack winters. Like most of the tailings block houses, these homes lacked indoor plumbing and heating. The kitchen stove provided heat to the rooms adjacent to the chimney, but this must have left the front sitting room and bedrooms extremely cold (See Fig. 17).

Among the seven houses along Joyce Road, masons and carpenters executed subtle variations in facade decoration. All seven homes featured some wood siding immediately under the roof line at each gambrel end. This siding extended halfway down the second story windows on four of the houses: numbers 472, 474, 480 and 484. This siding stopped just above the second story window at numbers 476, 478, and 482. Number 472 has plain masonry lintels and a single projecting sill course just above its foundation. Number 474 features keystoned lintels at first

floor and basement windows, and a large "picture" window fills two-thirds of the first floor facade. Numbers 476 and 478 lack keystones, but have three projecting belt courses: at the level of first floor lintels and sills, and just above the foundation. Number 480 is the most embellished, with a double belt course above first floor windows, a projecting sill course just above the foundation, and smooth-faced quoins at both exterior and interior corners. In addition, at least the lower portion of the roof is of slate, while all other Type One roofs were originally shingled. The original wide-board siding of the second story has been replaced with a more decorative fish-scale shingle. Number 482 is identical to 476 and 478, while number 484 is identical to number 474. The differences between these homes is subtle, but does relieve some of the monotony of their parallel siting and identical floorplans (See Fig.'s 23-29). Not surprisingly, it was the fanciest of these homes, Number 480, which was photographed for Lefevre's article (See Fig. 16).

The three Type Two houses combine the use of rough-faced tailings block with a smooth-faced tailings brick. The brick is limited to the second story of each home, just under the gable ends, and extending midway down the second story window. Each house features a double window in the front sitting room, and a wooden entry porch with simple,

square columns and a plain pediment or shed roof. All originally had slate roofs. As originally built, the three houses were identical, with what appeared to be masonry lintels with projecting keystones at all windows, fifteen-over-one light windows, and simple, pedimented entries with adjacent shed-roofed porches. No decorative columns originally supported porch or entry pediment; utilitarian metal posts are used (See Fig.'s 49 and 50). Not surprisingly, two of the three porches have been enclosed, while the third, 446 Wall Street, has had a substantial wooden porch added. 446 Wall Street has retained its original multi-light windows, but has lost its masonry lintels, due to an inherent design flaw which will be discussed in Chapter IV (See Fig.'s 30-32).

The two Type Three houses, large and rectangular in plan, with barn-like gambrel roofs, display some of the same simple decorative elements as the Type One and Type Two houses, but this decoration is swallowed up by the larger facades. Each has one gabled dormer centered on its second floor, south elevation. Each originally featured an open entry, or grade-level porch, both of which have been enclosed (See Fig.'s 51 and 52). The southernmost of the two, at the corner of Joyce Road, has its material indicated as "cement," rather than "cement block," on the 1916 Sanborn Map,[6] but employs rough-faced tailings block

in projecting quoins at both inner and outer corners of the building. At some point after 1916, this house was re-faced with vertical wood siding, perhaps to cover a failed or scaling stucco coating. The northernmost of the two Type Three houses, at the corner of Wall Street, is of rough-faced tailings block, and retains both the lower portions of its slate roof and several of its original twelve-over-one-light, double-hung windows. Both houses feature keystoned masonry lintels. Both houses employ several double windows, perhaps an attempt by a carpenter to compensate for the flat, barn-like expanse of the facades (See Fig.'s 19 and 35).

The seven Type Four houses were also large and rectangular in plan. Although the floorplans are identical, the three houses on the east side of Sherman Road featured center gables, while the three on the west side and the one double house on the north side of Wall Street featured hipped roofs. The seven houses, with their rectangular plans, are very plain, but do not look awkwardly large or barn-like. With their hipped or center-gabled roofs, symmetrically placed windows, projecting string courses, lintel blocks (two blocks per lintel rather than a single rectangular lintel), and quoins, often of contrasting texture to the surrounding face block, these double houses present an imposing appearance, reminiscent of contemporary Georgian

Revival housing design. Although pleasing in proportions, the Type Four houses were essentially simple workers' tenements, and lacked the decorative detail of contemporary, commercially developed domestic construction. Other than the string courses and quoins, no masonry decoration was used, and no attempt was made to subtly vary the facades of these identical double houses. The fact that six of the houses were built in straight rows lining both sides of a short street tends to emphasize the fact that they were two-family, and therefore more modest, homes than those of Type One, Two or Three (See Fig.'s 20a, 20b and 34). The Type Four houses do compare favorably with the four-family tenements of Witherbee, which were twice as long and lacked the hipped roofs of the Type Four houses (See Fig. 35).

The single Type Five and single Type Six home were virtually identical in plan and roof line, with open porches at either end of each front facade. The Type Five house, unlike the double houses of Type Four, employed both rough-faced tailings block and smooth-faced tailings brick, while the Type Six house used both rough-faced tailings block and smooth-faced block. Like the Type One houses directly across the street, the Type Five house employed keystoned lintels and projecting, smooth-faced sills. The most unusual facade embellishment of the Type Five house is

a decorative band course between first and second floors, consisting of three courses of tailings brick laid at a forty-five degree angle, creating a saw-toothed pattern. Each gable end of the Type Five house was laid up in smooth-faced, running bond tailings brick, and its front elevation featured four sets of double windows with fifteen-over-one light windows. The Type Five house was featured in several contemporary periodicals, which termed it "well-designed," and described its original occupants as "machinists, etc.," i.e., skilled workmen.[7]

Although very similar to the Type Five house, the Type Six house was unique among double tailings block houses in that it was built specifically for a mine superintendent, who shared the double house with his father (See Fig.'s 21 and 22). The importance of its original occupant is indicated by subtle masonry embellishments, by the addition of a large stable at the rear, and by its siting along the Plank Road. To enhance the exterior masonry of the Type Six house, a variety of molds were used to create tailings block elements with different shapes and surface textures. Even the basic building element, rough-faced block, was cast in different sizes, with square units forming porch columns, and rectangular units cast with rough faces on both stretcher and header, to create a variant of Flemish bond. Windows were framed with smooth-faced block quoins,

while arched lintels were constructed of tailings brick. Cast concrete elements, like the porch roof slabs, were scored on exposed edges to mimic brick. A cast concrete egg-and-dart sill course was included just above the foundation. A tailings block stable, with gambrel roof, graced the back yard, instead of the usual wood-framed barn. A coal-fired furnace provided steam heat to both house and stable, by means of underground pipes connecting the two buildings. The original roof was of slate, and even gable vents in the front facade were decorative: each vent was a round window, echoing the round cast concrete finials of the porch directly below. All of these elements combined to differentiate the status of the resident of the Type Six house from that of the volumetrically similar Type Five house (See Fig.'s 36-43). Along with architectural detail, landscape design, or the lack thereof, was also an indicator of the status of residents of the tailings block houses. The landscape surrounding Mineville's tailings block houses will be explored in the section which follows.

Landscape Elements

According to S. Lefevre, chief engineer for the Witherbee Sherman Company, the tailings block houses were built "a

few at a time wherever a clear space could be found and the slopes were not too steep."[8] Unlike many other turn-of-the-century company housing developments, in which formal landscape or site planning preceded construction, no site or overall street planning preceded construction of the tailings block houses. This lack of site planning or landscaping is consistent with the construction of company housing in a pre-existent company town. Often, when new housing was built in an existing company town, no master plan governed construction. Instead, varying types and quantities of housing were built at different times, to meet the needs of a periodically expanding work force.[9]

At the time the tailings block houses were built, the inadequacy of workers' housing was widely criticized, both in the popular press and in contemporary social science journals. The housing provided in remote mining communities was found particularly lacking, probably because of the finite life-span of most mining installations. The huge influx of immigrants and the resulting overcrowding of urban tenements during this same period also fueled the movement for the reform of workers' housing. Some turn-of-the-century captains of industry were sensitive to vilification by the press, and responded by hiring professional designers to plan new company towns, or to tidy up existing housing. In industry, where skilled

workers could leave one factory for another which provided better services, there was an added incentive to provide more than adequate housing, schools, and recreation facilities for workers' families.[10] Proud of their accomplishments, leaders of both manufacturing and extractive industries presented papers on their exemplary housing and social programs to meetings of their trade associations. Chief engineer Lefevre presented his paper, "Housing and Sanitation at Mineville," to a meeting of the American Institute of Mining Engineers in 1915. The paper was then published in the Institute's periodical, illustrated with sketches of a company-designed incinerator, as well as floor plans and photographs of five types of tailings block houses.

Although engineering innovations, including the use of the tailings block itself, earned the tailings block houses publication in several contemporary journals, no architects, planners, or landscape architects were engaged by the Witherbee Sherman Company to supervise their design or construction. This lack seems most evident in the unimaginative siting of the houses in straight rows along perpendicular streets. The naturally hilly terrain added some interest and views to an orthogonal street plan, but rows of identical houses were routinely oriented in exactly the same direction; even a simple mirror-image variation in

plan was not attempted. The garden-city movement, imported from Britain and first applied to American workers' housing contemporarily with the construction of the tailings block houses, does not seem to have influenced their design.[11] The only evidence that the Witherbee Sherman Company was cognizant of this popular landscape movement appears in Lefevre's 1915 article, in his description of company-sponsored contests for the best-kept gardens, lawns and flower boxes.

Little visual evidence of these gardens survives. Photographs taken between 1909 and 1913, for publication in mining and construction journals, show sparse evergreen plantings on otherwise stark front lawns. Some flowering shrubs do appear in photographs of single family houses taken from 1913 to 1915. Gardens are visible in one photograph accompanying Lefevre's 1915 article: low plank fencing has been installed in front of four-family tenements, marking off individual gardens. Home-made, ladder-like plant stands emerge from tenement windows, supporting potted flowers. At least one whitewashed picket gate is visible (See Fig. 44). Because these gardens did not appear in earlier photographs of the Witherbee tenements (See Fig. 35), it seems apparent that decorative gardens and shrubs were an afterthought; adequate housing for its workers was of tantamount importance to the mining

company.

Gardens and flowers were added several years after construction of the tailings block houses was complete; between 1909, when the first journal article appeared, and 1915, when Lefevre wrote about the company-sponsored garden contests. Photographs taken for a 1913 article show vines, flowers, and large trees surrounding a "concrete block house occupied by clerks and foremen" (See Fig. 45); a fence but no plantings bordering "double concrete block houses occupied by machinists, etc."(See Fig. 46); and an ungraded, grassless yard with one lone shrub decorating the front of a four-family tenement (See Fig. 35). By 1915, ivy had grown up along the porch of the "concrete block house occupied by clerks and foremen," a rocking chair and additional flower pots graced the front porch, and additional flowers softened the foundation (See Fig. 47). As the years passed, renters and, eventually, owners of the tailings block houses would add trees and flowers, fill in porches, and use siding and paint to differentiate their homes from adjacent look-alikes.

The engineers who designed the tailings block houses for the Witherbee Sherman Company had neither an open nor a partially forested site to work with. The former, an empty building site, might have inspired a more geometrically

regular community, while the latter, a forested site, might have led to a more gracefully landscaped development. Instead, tailings block houses were built on former forest land which had been almost entirely denuded of trees. In addition, the tailings block houses were not all built in the same place. Although rows of four or six identical tailings block houses were built, they were not always linked to other rows of tailings block houses. Instead, the new houses were sometimes squeezed between existing, mostly wood-frame, industrial, commercial, and residential buildings which had been built in Mineville over the previous forty years.

For cohesiveness, the tailings block houses had their construction material and their detached barns in common. For landscaping, the company provided some shrubs and fencing. One fencing design, which combined rough-faced tailings block posts with "waste wire rope," was termed "novel" by Cement Age,[12] but inevitably corroded and was demolished. Perhaps under-maintained after the company sold the tailings block houses, a second fencing design, which combined the same posts with cast iron pipe, also eventually corroded and was demolished.[13] Although stark rather than elaborate, this tailings-post fencing seems to have been reserved for the more elaborate single or double houses (See Fig.'s 46 and 48). The even less durable plank

fencing, which surrounded tenement gardens c.1915, has also disappeared.

At the same time that fences and original roofs have deteriorated and disappeared, owners have added coats of paint, shingles and siding to their tailings block houses, in part in an attempt to obscure the block itself. The results have been mixed. With their parallel siting, the tailings block houses look as identical as ever, despite differences in color and texture. Landscape elements like flower beds and fencing, added by the company in the years immediately following construction to enhance community pride, have disappeared at the same time that owners have attempted to differentiate their houses by obscuring their common construction material. With the loss of these connecting elements, Mineville has lost some of its feeling of continuity and community.

CHAPTER NOTES

[1]For description of stores in Mineville, 1866-1885, see H.P. Smith, ed., History of Essex County (Syracuse: D. Mason & Co., Publishers, 1885), 607-8; for Witherbee's tailings block stores, see Fig. 13. Proving that many of the wooden commercial buildings of Mineville predate the tailings block commercial buildings of Witherbee is difficult, since most of Mineville's commercial buildings no longer exist. However, the rambling floor plan of the Crystal Hotel of Mineville, as shown on the 1916 Sanborn map, indicates that it was probably built in the 1870's or 1880's and added on to in subsequent decades. Similarly uneven footprints indicate the pre-1916 lineage of other wooden commercial buildings on the Plank Road: the triple building housing a butcher, a barber, and a clothing store, for instance.

[2]Smith, 608, Rosenquist, 31. See Valerie Rosenquist, 27-33, for history of Catholic church in Moriah. Irish Catholic immigrants had established themselves in Mineville with the first great Irish immigration, in the 1840's, two generations prior to the arrival of Italian and Hungarian immigrants. They founded a church in Port Henry in 1852, close both to the Cheever mines just to the north and to the commercial center of Port Henry, where second generation Irish immigrants were establishing stores. It was not until 1870 that the Catholic miners in the more remote Mineville, generally Irish immigrants who had not succeeded from mining to the mercantile trade, were granted their own church by the diocese, and St. Peter's and St. Paul's was built in 1872.

Primary evidence that the Irish population was established prior to the construction of the tailings block houses is found in the local newspaper, as in this advertisement appearing in a "Moriah Supplement" to the Essex County Republican, Vol. LXVII, No. 13, Friday, November 24, 1905:

> J. J. O'BRIEN, MINEVILLE,
> Keeps a meat market and sells all kinds of Chicago and native meats at lowest possible prices. Why don't you patronize him? He is an honest dealer, who will give you a hundred cents' worth for a dollar every time you trade with him.

[3]Frederic F. Lincoln, "A Concrete Industrial Village," Cement Age: A Magazine Devoted to the Uses of Cement (September 1909), 162.

[4]For a summary and critique of worker's housing, see Leifur Magnusson, "Company Housing," Encyclopaedia of the Social Sciences III, (New York: The MacMillan Co., 1937), 115-118; for a critique of concrete block architecture, see Oswald C. Hering, "Concrete Block," Concrete-Cement Age (February, 1913), 77-8; and "Advancing the Architectural Appeal of Concrete Wall Units," Concrete-Cement Age (April, 1914), 195-7.

[5]S. Lefevre, "Housing and Sanitation at Mineville," Mining and Metallurgy Bulletin 98 (Feb. 1915), 233.

[6]It is unclear whether this means the house was built of reinforced concrete, with the tailings block quoins built up first and the concrete forms framed to incorporate them, or if the house was stucco over block. The latter seems more likely, since, according to Pat Farrell, houses using stucco were built on nearby Wall Street in the previous year, 1907. Those houses were supposedly of stucco over wood-frame construction; but the fact that the Sanborn Map indicates that this house is "concrete" implies that the stucco was applied over block.

[7]Lincoln, 162; "Witherbee, Sherman and Company, Mineville, N.Y.," Monthly Bulletin of the American Iron and Steel Institute I, 9 (September, 1913), 246.

[8]Lefevre, 227.

[9]For a summary of company housing types in the northeastern United States at the turn of the century, including housing built in a preexistent company town, see Leland M. Roth, "Three Industrial Towns by McKim, Mead & White," Journal of the Society of Architectural Historians XXXVIII (December 1979), 320-21.

[10]Magnusson, 116; Roth, 319.

[11]For a discussion of the impact of the garden-city movement on architect-designed workers' housing in the northeast, 1910-1918, see Richard M. Candee and Greer Hardwicke, "Early Twentieth-Century Reform Housing by Kilham and Hopkins, Architects of Boston," Winterthur Portfolio 22, Number 1 (Spring 1987), 47-80.

[12]Lincoln, 162.

[13]William and Leah Gray, Interview and tour of house, Mineville, Moriah, New York, 3 August 1988.

CHAPTER IV: ANALYSIS OF TAILINGS BLOCK AS BUILDING MATERIAL

Material Properties of Concrete Manufactured with Iron Ore Tailings Aggregate: Compressive Strength, Absorptive Properties

The tailings block used in the construction of the Mineville houses was tested in 1909, just prior to the publication of an article on Mineville in Cement Age. The testing was performed by G.B. Dixon, Chief Chemist of the Glens Falls Portland Cement Company of Glens Falls, New York, which supplied some of the Portland cement used in the construction of the tailings block houses. Technically, the results of these tests apply only to those tailings block made with Glens Falls cement. However, for the purposes of this study, we can assume that all the tailings block used in the Mineville houses would have performed similarly.

The Cement Age article states that the tailings block were manufactured using a cement mix of 1:5, Portland cement to tailings. No sand or gravel were mixed with the tailings, and this accounts for the production of a "very superior concrete block," according to author Frederic F. Lincoln.[1] No range of sieve sizes for the tailings

aggregate is given in the article, but it is mentioned that prior to mixing the more fine-textured tailings brick, the tailings aggregate was screened. A recent sampling of tailings found them to be fairly fine-textured, similar in color and appearance to a fine yellow beach sand. Somewhat oddly, the 1:5 mixture used in tailings block manufacture was not duplicated in Dixon's testing. Instead, Dixon tested the following mixtures:

Mix Ratio	Mix Contents	Time Set	Compressive Strength
1:3	1 Part "Iron Clad" Portland Cement to 3 parts iron ore tailings	7 days	341 psi
1:3	" " " " " "	28 days	450 psi
1:4.4 :9.42	1 part "Iron Clad" Portland Cement to 4.4 parts iron tailings to 9.42 parts broken stone	30 days	1010 psi
1:4.4 :9.42	" " " " " " " "	60 days	1273 psi
1:4.4 :9.42	" " " " " " " "	90 days	1428 psi
1:4.4 :9.42	" " " " " " " "	120 days	1528 psi
1:4:4 :9.42	" " " " " " " "	150 days	1653 psi
1:4:4 :9.42	" " " " " " " "	180 days	1686 psi

Concrete block testing was not completely standardized until about 1925, although tests on Portland cement itself

were standardized by about 1900. After 1900, block manufacturers began to supply the results of their own, non-standard compression and absorption tests with their product literature.[2] Although it is extremely difficult to assess the results of turn-of-the century tests, which used different sample quantities, cement mixtures, and curing times, one can compare both the results of Dixon's tests and the cement block mixture described in Lincoln's article with test values described and mixtures recommended in contemporary industry handbooks. Several treatises devoted to the manufacture of concrete block, sponsored by Portland cement trade associations, were published between 1905 and 1910: Spencer B. Newberry, the manager of a Portland Cement Company, published two in 1905; Harmon Howard Rice published an article on the subject in Cement Age in October 1905; Mr. Rice and William M. Torrance published a book on the subject in 1906 and Rice a second the same year; a pamphlet by Newberry was issued by the National Association of Cement Users in 1906; and in 1908, Charles Palliser published an illustrated volume: Practical Concrete-Block Making, based in large part on Newberry's 1905 works.

For the manufacture of concrete block, Newberry recommended mixing cement and aggregate in the following proportions: Cement 1: Hydrated Lime 1/2: Sand and Gravel 6. The

success of this relatively poor mixture depended on a properly graded aggregate, with the distribution of coarse and fine materials necessary to fill voids, creating a dense concrete. If interior walls were not furred and lathed, but plastered directly, then a richer and more water-resistant concrete was needed; Newberry recommended the following mixes: Cement 1-1/2: Hydrated Lime 1/2: Sand and Gravel 5, or Cement 1: Hydrated Lime 1: Sand and Gravel 5. Newberry also mentions a 1:5 mix without lime, the mixture that, according to Cement Age reporter Frederic Lincoln, was employed in producing Mineville's tailings block. Elsewhere, the mixture used in the manufacture of the tailings block is quoted as 1:6.[3]

Dixon's tests of the Mineville block seemed to be skewed towards demonstrating the strength of tailings block even when formed with a very poor mixture: 1:13.82, cement to mixed stone and tailings. At 30 days, this concrete had a compressive strength of 1010 psi, which matches the minimum standard of 1000 psi for concrete block at 28 days set by the National Association of Cement Users in 1906.[4] The richer 1:5 mixture used in the tailings block would have far exceeded 1000 psi. Newberry set the compressive strength of a block of 1:5, cement to sand and gravel, at over 2,000 psi at 28 days, and over 3,000 psi at one year.[5]

In order to assess Dixon's 1909 results, and to compare the strength and absorption of turn-of-the century tailings block to standard 1980's concrete block, compression and absorption tests were run on four large fragments of c.1910 tailings block. Tests were performed by E. L. Conwell & Co., Engineers, Chemists, Inspectors, of Bridgeport, Pennsylvania, on November 6, 1989. The results of these tests are included in the Appendix to this paper, as Exhibit A. The tests found that for three samples of block, compressive strength ranged from 3290 to 4570 psi (a 30% variation), with density of the test block varying from 145.9 to 150.1 pcf (insignificant variation). Absorption tests were run on a single sample, which showed 8.1% absorption after 24 hours of immersion. The source of the c.1908 samples was the site of a tailings block building demolished over ten years ago, so each sample block was broken into several pieces and weathered on all sides. Lacking the protection of surrounding masonry, the sample fragments appeared porous on the surface. Despite their exposed condition, the samples far exceeded modern minimum standards for compression and absorption:

Compressive Strength: Samples	Compressive Strength: ASTM C 90-85 (Hollow Load-Bearing cmu)	Compressive Strength: ASTM C 145-85 (Solid Load-Bearing cmu)
S1 4570 psi		
S2 3790 psi		
S3 3290 psi		
Average of 3 Samples:	Average of 3 Samples:	Average of 3 Samples:
3883 psi	Minimum 700-1000 psi	Minimum 1200-1800 psi

% Absorption: Sample 4	% Absorption: ASTM C 90-85	% Absorption: ASTM C 145-85
8.1%	13 - 20%	13 - 20%

In both compressive strength and absorption, Mineville's tailings block exceeds today's minimum standard specifications by a factor of 2 to 3 times. These tests prove that contemporary claims concerning the great density and strength of tailings block were not exaggerated, and emphasizes that the special material qualities of tailings block were not adequately exploited by Witherbee-Sherman's engineers, as will be discussed in the section which follows.

Contemporary Arguments for the Use of Tailings Block

As discussed in the introductory chapter, contemporary trade literature praised the material properties of concrete manufactured with iron ore tailings aggregate. Oswald Hering, an architect and vocal critic of vernacular houses of concrete block, mentions the use of tailings block in his 1912 monograph: Concrete and Stucco Houses, stating that a 1:5 mixture of cement:tailings was equal in strength to a 1:3 mixture of cement:sand, due to the "sharpness" or hardness of the tailings aggregate.[6] Frederic F. Lincoln, in his article on Mineville for Cement Age, goes even further, citing Dixon's tests and claiming that a 1:5 mixture of cement:tailings had double the compressive strength of a mixture of 1:3 cement:sand.[7] Despite variations among the contemporary assessments of tailings block, the unusual compressive strength of the material was noted by all. Despite this special property, a compressive strength which far exceeded the standard or required strength for concrete block building units, no attempt was made on the part of the builders of Mineville's tailings block houses to exploit the special properties of the tailings concrete. For instance, given its higher strength, Witherbee Sherman engineers might have varied from the standard wall thickness, casting a narrower block

to carry the same load as a standard cement and gravel block. Mineville's blocks measured 8" x 8" x 20", the industry standard thickness. Although many city building codes required foundation walls to be 12" thick, Mineville's engineers might have experimented with the 8" block as the foundation unit, relying on the material's greater compressive strength to make up the difference in width.[9] By taking advantage of the great compressive strength of the tailings block, Mineville's engineers might have built higher buildings: three stories of unreinforced block instead of two. Instead, claims of great compressive strength were made, but not exploited. The tailings were available, they were free, and they were therefore utilized.

Brief History of Concrete Block; Its Use in Domestic Construction; Contemporary Applications

The use of concrete block as both backup and facing material first achieved widespread popularity in the United States in the 1890's.[8] While concrete block building technology was pioneered much earlier, with U.S. patents for hollow-core concrete block dating from the 1860's, it was not until the 1890's that domestic production of Portland cement was established, helping to make concrete

block an even more affordable alternative to other masonry.[10] The presence of local concrete producers meant the development of new trade networks, as the fledgling concrete industry formed trade associations, published journals, and generally promoted the use of concrete in all types of construction. After 1900, the new concrete industry increasingly lobbied for the standardization of building codes and insurance assessments governing concrete construction, and performed self-regulation by developing standard specifications for concrete manufacture and testing.

Ann Gillespie, in her study of the Canadian manufacture of decorative or "artistic" concrete block, divides the history of the decorative block into two phases, spanning fifty years, from the 1870's until about 1920: "the early or pioneering phase, characterized by the prevalence of the rock-face block, which lasted into the first decade of this century, and the transitional phase, characterized by the dressed stone block."[11] The "rock-face" block is what we have termed "rough-faced" block in our description of the Mineville houses. Gillespie writes that the appearance and popularity of the two types of block were determined by developments in block manufacturing equipment. Blocks could be cast in simple wooden boxes, but to produce large quantities of block of identical shape and size, durable

cast-iron molds were developed.[12] To speed the process of block manufacturing, mechanical molds were designed, with built-in tamping levers to compress shallow layers of concrete, built-in cylinders to produce hollow cores, and hinged sides to allow the release of the finished block. The machines were an improvement over hand-formed block, providing a denser block through even tamping, and a lighter block by creating hollow cores. The hollow core block also helped alleviate condensation, provided an air space for better insulation, and used less material to manufacture.[13]

Between 1870 and 1910, the type of block machine generally used was known as the "side-face" machine, consisting of a metal box with removable hinged sides, mounted on a convenient, waist-high stand. In 1902, the "down-face" machine was introduced by the Ideal Concrete Machinery Company of Cincinnati, Ohio.[14] The down-face machine featured a mold box mounted on a lever, with the face texture of the block determined by a cast iron bottom plate, which in turn was often cast directly from an actual cut and tooled stone. Once the mold box was filled with tamped concrete, the entire box, including bottom "face plate," was tilted up at a forty-five degree angle, allowing the hinged bottom and sides to be swung away, and the block to be released (See Figure 53).[15]

With the side-face block machine, blocks were cast in an upright position, with a fairly dry mixture tamped into the box in at least four separate layers. The face texture of the block was determined by the texture of the hinged sides. Blocks could be cast quickly, as the dry mixture, and the hinged sides, allowed the block to be removed from the box almost immediately after being formed. The fact that the texture of the block face was determined by the side panels meant that the mixture used had to be homogeneous; it was not possible to use a different mixture to cast the sides vs. the center of each block. Attempts were made to segregate the sides or face mixture from the center mixture by means of separating plates, which were lifted out prior to removal of the block from the mold. However, this created a block with a built-in flaw or cleavage plane between the face and body. In order to create a strong block, a uniformly rough-textured mix, employing a coarse aggregate, had to be used. The use of this rough concrete created a block with a porous, pebbly surface texture, which could best be disguised by using the "rough-faced" casting plate.[16] The uneven surface of the rough-faced block hid the flaws created by the coarse aggregate.

With the development of the down-face machine, a one-inch

layer of finely textured concrete could be tamped in first, followed by the stronger mixture employing a coarse aggregate. This allowed the use of a variety of casting plates, including dress-faced stone designs with sharp, beveled corners, raised central panels, or even raised wreaths or garlands more typical of finely textured ceramic masonry units.[17] The use of a different facing mix also provided the opportunity for varying the color and texture of the face block by adding colored aggregates or mineral pigments to the face concrete. The extra expense of a crushed colored stone or mineral pigment was limited to a small quantity of material, encouraging experimentation. This allowed the production of block of various colors and textures, often more lively than the dull grey of Portland cement block, and enabled block manufacturers to mimic the colors of various natural stones.[18]

Whether produced from carved wood molds in a limited quantity, or cast in either of the two block machines, the newly manufactured blocks were placed on pallets to air-cure for seven to ten days, during which time they were sprinkled periodically. This sprinkling prevented rapid drying of the exterior of the block, and ensured even crystallization of the cement throughout the block. Cement block generally achieved maximum strength and was fairly stable from evaporation shrinkage by about one month, but

at least one turn-of-the-century manufacturing guide recommended a six month curing time.[19]

It is not clear whether Mineville's tailings block were cast in a side-face or a down-face machine. Frederic F. Lincoln, in his 1909 article on Mineville for Cement Age, writes that the tailings block were manufactured on a "Hercules Machine," manufactured by the Century Cement Machinery Co. of Rochester, New York, while the tailings brick were manufactured on a "Peerless" brick machine manufactured by a company of the same name in Minneapolis, Minnesota. Because no special facing mixtures were attempted, and because experimentation with tailings block was begun by mining management as early as 1903, it is likely that an earlier model, or side-face machine, was selected. With its one step removal process, the side-face machine allowed for faster block production. What is interesting to note is that the regional cement manufacturing industry was complemented during this period by the development of a regional block machine manufacturing industry.

All technological developments in the manufacture of concrete block, from about 1860 through 1910, were aimed at producing a decoratively faced block which convincingly mimicked the appearance of natural, quarried, or cut

stone.[20] Unlike reinforced, poured concrete, then known as "monolithic concrete," decoratively faced concrete block provided the building trades with a construction material which was familiar, as it was similar to brick or stone masonry units in size, shape, and weight. In contrast to concrete block, monolithic concrete could not be purchased in units of standard size. While the manufacturing process for concrete block was very similar to that developed for clay brick, monolithic concrete was mixed wet, poured into forms, and most often manufactured on site and in place within a wall. The successful use of monolithic concrete during this period required skill and experience, particularly in avoiding shrinkage of long sections of wall, while a relatively unskilled workman could manufacture block or lay up a concrete block foundation.[21] Concrete block, dressed stone, and brick could all be treated in the same way, and even easily combined within the same building, using existing masonry building technology. The use of block did not require a mason to purchase any special tools, nor did it require him to be trained in any special way.

The education required before architects and buildings tradespeople could work with concrete in a new and sophisticated manner was discussed by Rolf R. Newman, a Riverside, California engineer, in a 1914 article in

Concrete-Cement Age. Rolf blamed the profusion of unimaginative, foursquare concrete block houses built between 1900 and 1910 on the innate conservatism of the building trades and design professionals:

> It is undoubtedly a fact that engineers have done more than architects in establishing "correct methods" and assisting in the "proper organization" of such work as applied to house construction, because they have approached the matter from other fields of experience in which they have used cement. Architects and builders are as a rule more bound by precedent in the matter of building materials--more closely related to and allied with the existing building trades--than engineers. For this reason the concrete house today is more a product of engineering than it is of architecture. For complete success it must, however, become both architecturally and structurally correct.[22]

The essentially conservative nature of decorative concrete block was both a help in its early marketing and a hindrance in sustaining its popularity.[23] Increasingly, after the turn of the century, architects and building product manufacturers sought "honesty" in materials, bringing this discussion, and a critique of the decorative concrete block, to the editorial pages of building trade journals. The popularity of block as a vernacular building material persisted until about 1930, when the growing influence of modernism and of industrial architecture, contemporary developments in steel construction, improvements in "monolithic" or poured concrete technology and design, and the dissemination of new concrete

engineering methods within the architectural community eclipsed the lowly, and to modern eyes, dishonest, decorative concrete block.

In the trade literature of the period 1912 to 1914, immediately following the construction of Mineville's tailings block houses, one issue dominated any discussion of concrete block: the objection, by the architectural community, to its use in domestic construction. To overcome the objection that concrete block, unlike the natural stone for which it substituted, presented a dull and monotonous appearance, the trade journals offered recipes for exposing surface aggregate by removing the surface skin of concrete to enhance the color and reflectivity of the block. Other suggestions included forming the block from casts taken from actual cut stone, prescribing the number of different molds necessary to produce an adequate variability of wall texture. The more elite architect-critics denied that concrete block, with its unvarying standard-sized unit, would ever be an appropriate domestic building material, unless masked with stucco and used in combination with classical detail: capitals and balusters of specially molded or sculpted concrete. Frequent criticism was aimed at the artifice of the most common form of concrete block: the rough-faced block, which was found both false and monotonous. The

rough or rusticated face masked surface flaws and allowed the use of a larger aggregate, for increased strength,[24] but never successfully imitated dressed stone. In defense of block, if not rough-faced block, one critic argued that while the rough-faced block failed as an imitation of quarried stone, the smooth-faced block, employing a colored aggregate, could be both honest; i.e., visibly of concrete, and attractive.[25] It was this current in the design community which would lead to the commercially successful production of concrete products known as "cast stone," which was extemely popular from about 1910 through the nineteen-twenties. Although it was most popular among architects in the art deco period, cast stone is still manufactured. Cast stone has been seen recently in the 1980's as designers have turned to richer, polychromatic materials to clad steel-framed buildings. Cast stone is also often specified in restoration projects as an affordable substitute for a particular natural stone which is no longer being quarried.

Turn-of-the-century trade journals illustrate various applications for decoratively faced concrete block, but domestic, rather than industrial or commercial buildings, were pictured most often. This focus on domestic construction reflected the most lucrative market, then and now, within the building industry: new housing

construction. Of twelve articles illustrating concrete block buildings appearing in Concrete-Cement Age between February 1913 and April 1914, two articles featured churches with decorative concrete block trim and smooth-faced concrete block walls; two articles described smooth-faced concrete block workmen's cottages in Norfolk, England, featuring concrete tile roofs and floors, while a third article showed cow-stalls and pig styes, part of the same complex and built of the same materials; one article featured a smooth-faced, concrete block schoolhouse of two rooms, constructed in Wilmington, North Carolina, using a beach shell aggregate; one article pictured a castellated, architect-designed garage, built of two-toned, smooth-faced concrete block; and the balance, five articles, illustrated and provided floor plans for single-family homes of concrete block. These houses ranged in size from modest workmen's cottages, like the twelve six-room cottages constructed by the U.S. Portland Cement Company of Denver for employees at a cost of $1,500 each, to an architect-designed, thirteen-room mansion of "broken ashlar" concrete block, constructed at Scarborough-on--Hudson, New York, at a cost of $15,000. The article emphasized the special facings cast onto the concrete block, employing both black and white crushed marble aggregate, tinted red to resemble pink granite, and used in the trim as well: smooth-faced concrete quoins, sills, and

lintels, as well as cornice, specially cast ionic columns and balusters were all tinted to resemble bluestone. The article also emphasizes that even these special treatments were affordable; the concrete work accounted for only $1,162 of the $15,000 cost.[26] In each case, the articles represent not the norm, but the apex of concrete block design in terms of special aggregates, facing textures and materials, or the best designed, most economically feasible plans for constructing workers' housing of concrete block.

From our survey of turn-of-the-century trade literature, we have a good sense of the application of concrete block to domestic construction. What the journals recommended and what was actually constructed, however, are two different things. While conducting historic sites inventories for state preservation offices in New England, the Midwest and the South in the 1970's and 1980's, J. Randall Cotton observed many concrete block survivors from the early 1900's. From his observation, the special aggregates and pigmented faces so touted in period literature were reserved for a very few, special buildings, such as churches.[27]

Found more commonly in Cotton's surveys were frame houses resting on concrete block foundations, with rock-face, cobblestone, panel-face and ashlar all popular face

designs. Another common application for concrete block was in the construction of new automobile garages in the 1920's; building codes required fire-proof construction, and concrete block provided an affordable material. A third common application for concrete block was in the construction of farm buildings. Cotton writes that Sears sold a "Farmer's Special" during this period, which produced segmental block for the construction of silos, a more elaborate application for concrete block than the rectangular British farm buildings illustrated in Concrete-Cement Age. Cotton found that concrete was an especially popular material for farm buildings in the Midwest, because "concrete block buildings were thought to survive tornadoes better than frame structures."[28] Cotton also found the use of concrete block most common in rural areas, for the commercial buildings of small town centers: feed stores, equipment suppliers, and gas stations; churches, again often in very rural communities, were also sometimes built of concrete block.[29]

The reasons for this prevalence of concrete block construction in rural areas were twofold: first, the fireproofing value of concrete, and second, the fact that a rural area might have too small a population to sustain other building material suppliers and building tradespeople: local lumber or brickyards, or local quarries

and skilled stone cutters. As the Sears Catalog and other block machine manufacturers made block machines readily available, the use of block spread rapidly in the hinterlands, where there was often a regional supplier of concrete, but a dearth of manufactured masonry materials.

Cotton's surveys did locate entire homes, as well as foundations, of concrete block, most built between 1910 and 1915, at the same time as Mineville's tailings block houses, during what Cotton terms the "post-Victorian" period:

> Block houses were built in Bungalow, Colonial Revival (even Dutch Colonial!), and Foursquare styles, as well as plain Homestead and farmhouse types. The uniform, rectangular dimensions of block made it an ideal building material for the boxy foursquare houses of the period.
>
> Quite often, two-storey [sic.] houses were cast block on the first floor, topped by shingled or clapboarded upper floor. Like foundations, the common face designs for house walls imitated stone. More ornate designs like egg-and-dart, "daisy belt," scroll, or rope-face were usually used as trim in water tables and belt courses, copings, cornices, and sills. Panel-face blocks could be used as corner quoins in conjunction with rock-faced walls.
>
> Porches were commonly constructed of decorative block; special moulds could produce columns, capitals, bases, balusters, rails and under-porch "lattice." Sears sold a complete porch block kit for $57.25 in 1908, which included a choice of Ionic or "Gothic" capital moulds.30

Many of the architectural modes and motifs identified by Cotton in his surveys are echoed in Mineville's tailings

block houses. Mineville's houses were built in the first and second decades of the 20th century, the period Cotton labels "post-Victorian," and featured both Colonial Revival and Dutch Colonial details. Like the "boxy" homes described by Cotton, Mineville's houses are strictly perpendicular in plan, without curves or towers that would be difficult to execute in modular blocks. None of the tailings block houses within the study group were built with tailings block below and wood shingles above; perhaps to be consistent in the use of fire-proof, low-maintenance materials. However, the very first row of tailings block houses, "Bridal Row," built in Witherbee c.1907, did feature wood-shingled second story gables as well as wood columned porches (See Fig. 54). While none of the later tailings block houses shared this feature, the design of the Type One and Type Two homes, with a change in texture or module at the gable peak from rough-faced to smooth block, or from block to brick, was another form of this differentiation. Many of the gabled homes were eventually modified, with shingles or clapboard added to the gable peak, above the tailings block base (See Fig.'s 24, 25, 27).

The elaborately detailed Type Six house, built for the Mine Superintendent at 511-513 Plank Road, featured many of the decoratively cast blocks and elaborate porch details

described by Cotton. Mineville's engineers probably did purchase special cast-iron plates, if not an entire "porch kit" like the one sold by Sears, in order to form the chamfered balusters, panel-faced quoins, and egg-and-dart sill course of this elaborately detailed home. The scored porch finials, the size and shape of melons, and the square, molded capitals of the porch columns would have been cast in individual box molds rather than block machines, and may well have been featured in a "porch" package sold by a block machine manufacturer. Other evidence for the use of a special "porch kit" is found in early photographs of 509 Plank Road (See Figure 45). These show an L-shaped, gambrel-roofed house, similar to the _Type One_ house in plan, but with a large front porch and a large, geometric stained glass window. Carrying the porch roof were two large, keystoned arches of segmental tailings block, with another arch at each return; porch columns were of tapered block, while the corner balusters were paneled, with squared-off but elaborate railing spindles. Arched or segmental blocks, like those carrying the porch roof of 509 Plank Road, were among the "porch kit" details found by Cotton in c.1915, foursquare homes in both North Carolina and Indiana. The two highly decorated Mineville examples, 509 and 511-513 Plank Road, represent concrete block at its most elaborate. After about 1915, with the decline in the use of concrete block in domestic construction, elaborately

decorated concrete block was no longer manufactured.

Is Tailings Block a Good Domestic Building Material?

As we have seen in the analysis of tailings block in the "Material Properties" section, above, the combination of iron ore tailings and Portland cement created an extremely dense and heavy block. As mentioned briefly in the Introduction, tailings block buildings have proved extremely difficult to demolish or alter. In an interview in the fall of 1989, one resident described his attempts to add a room to the rear of Number 430 Wall Street, a Type Four house. Although it was possible to saw-cut through joints, it proved impossible to cut a large opening through the block. A shed addition could only have been entered through an existing rear door, and would not have created the larger room desired. This same resident described a problem with heating the house: the lack of insulation. He was considering furring and insulating the house on the exterior, then cladding the entire facade with aluminum siding, although the expense of this work, along with his frustration in building an addition, indicated that he would prefer to move than to invest any further in the house.[31] The technique of adding exterior insulation, accompanied by aluminum siding, has been applied to No. 509

Plank road, which is now not visibly of tailings block and was therefore not included in the study group (See Fig. 55).

Also faced with the prospect of heat loss, the owner of one of the very large former boarding houses, located across from the Change House on Witherbee Road, formerly West or Back Road, in Witherbee, painstakingly removed the upper story of his house, block by block.[32] While the tailings block houses generally require less routine maintenance than their wooden neighbors, and while they have proved more fireproof, despite wood interior finishes, these values seem offset, to their occupants, by the material's weight and permanence, or its resistance to demolition and alteration. The problem of lack of insulation, however, is a problem endemic to older houses, and does not reflect on tailings block as a material. Residents interviewed did not seem to notice much insulating value in the thick masonry walls, although one house toured in August of 1988 was comfortable on an otherwise steamy day. The relative coolness of the tailings block houses in summer is consistent with contemporary claims about the insulating value of hollow concrete block.[33]

Other ongoing problems have developed with the tailings block houses, which will be discussed in more detail in

Chapter V. Essentially, these houses have proven to be as durable as their original construction detailing and the skill of their builders allowed. Because of the relative newness of the material and the isolation of their location, Witherbee-Sherman's staff carpenters and masons had to have been inexperienced with the manufacture and use of concrete block. Evidence of their experimentation with untested methods is found in the deterioration of certain stucco applique details found on the houses. Rather than casting lintels and keystones of tailings block, for instance, the mining company's contractors employed a shortcut. The casting of lintels and keystones would have required the construction of special box molds and the use of steel reinforcing rods. Instead of reinforced masonry lintels, stacked wood planks were used. To this wood, a mixture of tailings cement was applied directly, and decorative keystones either built up or formed over wood. In time, this pastiche deteriorated; the false keystones sheared from the plank back-up, and the composite wood lintel was left exposed to the elements. In other locations, masonry lintels were formed, but without properly designed steel reinforcement. Movement and cracking of surrounding masonry have resulted from these built-in structural weaknesses. Porch construction was another area where inexperience with masonry construction caused deterioration. Many original tailings block or

tailings concrete slab porches have been largely replaced as they were filled in to create additional rooms. The original porches were built directly on the ground, with no damp-proof course and no ventilation. As a result of this practice, the highly decorative porch of No. 509 Plank Road deteriorated rapidly and was removed by the mining company for the present owners in the late 1940's.[34] Other porches undoubtedly underwent similar deterioration, leaving occupants with no incentive to preserve the original porch configurations. The poor design detailing of the porches, combined with the difficulty in adding to the tailings block houses through exterior masonry walls, has led to their redesign and enclosure (See Fig.'s 30-33).

The Use of Tailings Block in the Heart of the Adirondacks: The Selection of Cement Block by Mining Management

The choice of tailings block as a building material by mining management was an unusual one. The most obvious reason for the choice was one of circumstance: Mr. S. Norton, the General Manager of Witherbee Sherman, had come to Mineville after working for a cement manufacturer.[34] He, or those he worked for, may have had invested in the recently developed regional cement industry. Mr. Norton, as a reader of the newly organized cement trade journals,

may have realized the publicity value of the construction of a concrete village "in the heart of the Adirondack forests."[35] Articles featuring the tailings block houses were published in three journals between 1909 and 1915: Cement Age in September 1909; the Monthly Bulletin of the American Iron and Steel Institute in September 1913, and Transactions of the American Institute of Mining Engineers in February 1915.

In the journals, the advantages of concrete block over wood frame construction are described as three-fold: reductions in routine maintenance (painting); protection against fire; and reductions in fuel costs due to the insulating value of the hollow block walls. The fact that the tailings existed as a free source of high-quality aggregate is also named as a reason for the choice. The construction cost of the tailings block houses is variously given as the same as wood construction (Cement Age), or as 10% higher than wood construction (Transactions), with the savings in maintenance paying the difference. Two other factors, not mentioned in the articles, contributed to making the choice of concrete block affordable: the depletion of local large-dimension lumber in the mid-19th century, and the establishment of regional Portland cement manufacturers in the 1890's: the Helderberg Portland Cement Co. of Home Cavern, headquartered in Albany, and the Glens Falls

Portland Cement Co. of Glens Falls, New York.

Cement Age illustrates the Witherbee Sherman Company's Port Henry powerhouse, and Witherbee schoolhouse, both built of monolithic or reinforced concrete, along with pictures of the tailings block houses and tenements. The article does not explain why the choice was made to use block, rather than monolithic concrete construction, for the workmen's houses. The issue may have been one of cost, although the more elaborate of the block houses, which featured indoor heating and plumbing systems, cost 12 cents per cubic foot, and a block office building, with reinforced concrete flooring, cost 17 cents per cubic foot, as compared with 14 cents a square foot for the "monolithic" school building. Cost for the more modest concrete block tenements and double houses, all without indoor plumbing, were much lower: from 6 to 9 cents per cubic foot.[36] The greatest savings, however, may have been in labor costs. The construction of reinforced or monolithic concrete buildings must have required the on-site supervision of S. Lefevre, the mine's chief engineer, or his immediate subordinates, whose chief responsibilities were elsewhere: engineering the safe removal of iron ore. The manufacture of the block and the construction of the block houses could be executed with much less supervision by less skilled workmen. Structural inadequacies in the construction of the block

houses, like the faux keystones, may have occurred through the unsupervised experimentation of workmen, not by the engineers' design. Evidence for this is found in the fact that the periodicals are quite specific about the use of a particular block or brick machine, the dimensions of blocks or the ratio of cement to tailings, but do not mention the use of stuccoed wood for exterior trim.

Traditionally, housing for miners has been temporary in nature, and invariably of wood. The housing usually was built to match the life expectancy of the mines. When the mines were exhausted, the housing left behind was depleted as well; or, if of frame construction but well built, the houses could be moved to a new site. Mineville's tailings block houses were built when the local beds had been active for half a century, already a significant length of time. The mines would prove practical to mine for only a half century more. By an irony of their construction, the eighty-year old tailings block houses, constructed of a by-product of the mines, have already survived the mines by thirty years.

CHAPTER NOTES

[1]Frederic F. Lincoln, "A Concrete Industrial Village," Cement Age: A Magazine Devoted to the Uses of Cement (September 1909), 158.

[2]Sidney Mindess and J. Francis Young, Concrete, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1981), 14; Theodore H.M. Prudon, "Simulating Stone, 1860-1940: Artificial Marble, Artificial Stone, and Cast Stone," APT Bulletin XXI No.3/4 (1989), 87.

[3]Spencer B. Newberry, Hollow Concrete Block Building Construction, (Chicago: Cement and Engineering News, 1905), 8-9; and S. B. Newberry, Concrete Building Blocks, (Philadelphia: Association of American Portland Cement Manufacturers), 7; S. Lefevre, "Housing and Sanitation at Mineville," Transactions of the American Institute of Mining Engineers (February 1915), 232.

[4]Charles Palliser, Practical Concrete-Block Making, (New York: Industrial Publication Company, 1908), 66.

[5]Newberry, Hollow Concrete Block Building Construction, 14.

[6]Oswald C. Hering, Concrete and Stucco Houses: The use of plastic materials in the building of country and suburban houses in a manner to insure the qualities of fitness, durability and beauty, (New York: McBride, Nast and Company, 1912), 15.

[7]Lincoln, 159.

[8]J. Randall Cotton, "Ornamental Concrete Block Houses," The Old-House Journal XII No. 8 (October 1984), 180.

[9]Lincoln, 160; Newberry, Hollow Block Construction, 12-13.

[10]Ann Gillespie, "Early Development of the Artistic Concrete Block: The Case of the Boyd Brothers," APT Bulletin XI No. 2 (1979), 30; Sidney Mindess and J. Francis Young, "Historical Development of Cement and Concrete," Concrete, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc.), 14. The two companies which provided the concrete for Mineville's tailings block houses, the Glens Falls Portland Cement Company of Glens Falls, Warren County, New York and the Helderberg Cement Company at Howe Cavern, Scoharie County, New York began operations in 1894 and 1898, respectively, as described in Henrich Ries, Ph.D., "Lime and Cement Industries of New York, Bulletin of the New York State Museum No.44 Vol. 8 (1901), 858, 866-69.

[10]Gillespie, 31.

[11]Palliser, 38-43.

[12]Cotton, 182.

[13]Gillespie, 39.

[14]Cotton, 183.

[15]Cotton, 182; Gillespie, 35.

[16]Cotton, 183; Palliser, 43-45.

[17]"House of Concrete Block, Attractive as to Color and Texture," Concrete-Cement Age (June 1914), 297-98; "House Built of Concrete Block with an Interesting Facing," and ""Advancing the Architectural Appeal of Concrete Wall Units,"Concrete-Cement Age (April 1914), 167-170 and 195-97; "House of Concrete Blocks and Stucco: A Design Involving a Combination of Materials Which Produce Very Pleasing Results," Building Age 36 (May 1914), 59-60.

[18]"Spraying Freshly Made Block," Concrete-Cement Age (January 1913); Palliser, 21-22.

[19]Charles H. Doubler, "How to Produce Realistic Stone Facings," Concrete-Cement Age (December 1912), 55-57; "Concrete Stone Tooled by Machinery; Methods in Manufacture and Use of Products of the Onondaga Litholite Company," Concrete-Cement Age (February 1913), 61-65; "Concrete Products--Architectural Considerations; The Materials for and Treatments of Surfaces of Concrete Building Stone," Concrete-Cement Age (October 1913), 155-160.

[20]Newberry, Concrete Building Blocks, 11.

[21]Rolf R. Newman, "A Review of the Development in the Construction of Concrete Houses--1907 to 1914," Concrete-Cement Age (April 1914), 168-170.

[22]Gillespie, 30, 37.

[23]Oswald Hering, "Concrete Block [letter to editor]," Concrete-Cement Age (February 1913), 77-78; Frank A. Bourne, "The Development of Concrete Block [letter to editor answering letter by Hering cited above]," Concrete-Cement Age (May 1913), 244-45; M. Wetzstein, Oswald C. Hering, W. L. Rohrer, A. T. Bradley, Charles H. Doubler, "Concrete Block--A Symposium," Concrete-Cement Age (March 1913), 139-142; J. Frank Norris, W. M. Kinney, and A. E. Cline, "Objections to Concrete Block, and the Answers," and W. F. McGann, "Why are not more Concrete Brick Used [in comparison with clay brick]?" Concrete-Cement Age (August 1914), 71-73, 77-78; J. K. Harridge, "Objections to Concrete Block, and the Answers," Concrete-Cement Age (September 1914), 126.

[24]Hering, Concrete and Stucco Houses, 52-53.

[25]"All the Exterior Trim of the Broadway Presbyterian Church, New York City, is of Concrete," in "Concrete Stone Tooled by Machinery," Concrete-Cement Age (February 1913) 61-63; "St. Luke's Church, Chelsea, Mass.," and "Church of Epiphany, Dorchester, Mass.," in "The Development of Concrete Block," Concrete-Cement Age (May, 1913) 244-45; "Concrete Block Cottages Built in England," Concrete-Cement Age (February 1913), 73; "Concrete Block Cottage at Wayford Wood Estate, Norfolk, England," in "Building Low Cost Concrete Houses in England, Concrete-Cement Age (April, 1914), 185; "Unit Cow-Stalls, Fodder Room and Pigsties," in "Concrete Block Farm

Buildings Built Economically in England," Concrete-Cement Age (March 1913) 142; "Concrete Block School," Concrete-Cement Age (May 1913), 247; "Concrete Block Garage, New Bedford, Mass." in "Two Tones of Granite-Faced Block in Garage Wall," Concrete-Cement Age (April 1914), 170; "Concrete Block Cottages Built Complete for $1500 Each," Concrete-Cement Age (March 1913), 137-38; "Evanston, Illinois, Concrete Block House," in "House of Concrete Block, Attractive as to Color and Texture," and "Cottage Built of White Face Block," Concrete-Cement Age (June 1913), 297 and 298; "Residence in Kansas City, Mo.," "Peoria, Ill., House," and "Residence in Evanston, Ill.," in "Advancing the Architectural Appeal of Concrete Wall Units," Concrete-Cement Age (April 1914), 195-96; and "House at Scarborough-On-Hudson Built of Specially Faced Concrete Block," in "House Built of Concrete Block with Interesting Facing," Concrete-Cement Age (April 1914), 167.

[26]Cotton, 183.

[27]Cotton, 181.

[28]Cotton, 182.

[29]Cotton, 181-82.

[30]Interview with resident of 430 Wall Street, October 8, 1989.

[31]Interview with resident of 430 Wall Street, October 8, 1989.

[32]L. N. Babbit, "Living in Concrete Houses," Concrete-Cement Age (April 1914), 190-91.

[33]Interview with Mrs. Martin, owner, with her husband, Howard, of 509 Plank Road, October 8, 1989.

[34]Lincoln, 158.

[35]Lincoln, 158.

[36] Lincoln, 162.

CHAPTER V: TAILINGS BLOCK HOUSES TODAY

A Survey of Houses in Study Group: Typical Alterations

There are several types of alterations which are common among the twenty-five houses of the study group. Overall, the single-family homes have been altered more frequently than the two-family homes. This phenomenon was explained in a 1989 interview with a resident of one of the large Type Four double houses: it had been difficult for him to convince the co-owner of his home to share the cost of proposed repairs or alterations.[1] The most common alteration is that of roof replacement, altering original slate roofs by replacing them wholly or in part with raised-seam metal or asphalt shingle roofing. This is followed by window and door replacement, which alters the configuration and material of original, multi-lite wood windows and panelled or plank doors. Another very common alteration is the construction of exterior chimneys of cement block. Next most frequent is the construction of additions, usually in the form of attached sheds or filled-in porches. The next most common alteration is the partial cladding or covering over of tailings block with wood clapboard, shingles, or with aluminum or vinyl siding. This cladding is usually limited to the upper

portion of the 2nd story; typically, at the gable peak of the Type One, gambrel-roofed houses. The final category of alterations is exterior painting, which markedly alters the appearance of the block.

Altogether, 18 of the 25 houses have had original slate roofs either partially or completely replaced with either asphalt or metal roofs. In some cases, upper roofs have been replaced with raised-seam metal roofs, while the slate has been retained at lower roofs, as at 480 Joyce, a Type One house, and at 423 Foote, a Type Three house (See Fig.'s 27 & 33). At 430-32 Wall Street, a Type Four house, half of the double house features a new metal replacement roof, while the other half retains its original slate (See Fig. 56). Intact slate roofs remain at 444 and 446 Wall Street, both Type Two homes (See Fig.'s 30 & 31). The reason for the replacement of original slate roofs in the majority of the houses can be found in the type of slate originally used. According to Frederic Lincoln, the roofing material chosen was "Granville second quality sea green slate, which is as cheap as lumber at that point."[2] The inferior slate almost invariably failed, or proved difficult to patch, and was eventually replaced.

Another built-in flaw in the tailings block houses was their lack of fireplaces and chimneys. The majority of the

houses were originally heated only by coal-fired kitchen stove, and nearly every home has augmented this original flue with a central heating system requiring an additional masonry chimney, usually of concrete block. Some of the larger homes, like 423 Foote, a <u>Type Three</u> house, have two chimneys, perhaps indicating the addition of a wood burning stove or fireplace in addition to the furnace (See Fig. 33). The <u>Type Six</u> house, unlike the rest of the houses in the study group, originally featured a coal-fired central heating system, and its large, central, brick chimney, with two interior fireplaces, has not been altered (See Fig. 57).

Window replacement, like roof replacement, has been conducted in an ad hoc fashion. Many of the tailings block houses retain at least one or two original windows, while the rest have been replaced. All of the original windows were double hung, but configurations varied. Some of the fancier homes featured multi-light (fifteen-over-one) wood windows. Most of the others originally had simpler, two-over-two light windows. Wood frames were flat, without raised moldings. Of the twenty-five houses in the study group, only half retain at least fifty percent of their original windows. Of <u>Type One</u> houses, 482 Joyce is the prototype, retaining all of its original two-over-two wood windows (See Fig. 28) The original double windows of the

first floor parlor at both Number 474 and Number 484 Joyce Road have been replaced with the same triple window (See Fig.'s 24 & 29). Two of the Type Two houses, Numbers 444 and 446 Wall Street, retain most of their original fifteen-over-one, multi-light wood windows. However, 446 Wall Street does have early replacement, or perhaps mismatched but original, two-over-one light windows at upper floors (See Fig.'s 30 & 31). One of the Type Three houses, 423 Foote, retains multi-light wood windows at the ground floor (See Fig. 33). Four of the Type Four houses, 430-32 Wall Street, and 408-410, 409-411, and 416-418 Sherman, retain their original two-over-two wood windows (See Fig.'s 56, 58, 59, & 60). All of the original multi-light windows of 503-505 Joyce, the Type Five house, have been replaced or altered into one-over-one wood windows, with exterior metal storm windows. Most of the windows of the Type Six house are now one-over-one wood windows, probably installed at the same time that the easternmost porch was filled in. This house does retain two-over-two wood windows at the carriage house and rear kitchen ell (See Fig.'s 61 & 62). In general, the multi-light wood windows seem to have been used on the fancier of the single and double houses, but the Type Six house is an exception to this rule. Overall, the original multi-light or two-over-two windows have been retained where they remained in good condition, sometimes only at

one window or at one floor, and replaced when they deteriorated, with exterior storm windows installed over original windows at many of the houses for added insulation.

Original wood-and-glass front entrance doors have been replaced at least as frequently as original wood windows, and for the same reasons. The simpler houses originally featured very rough plank doors (See Fig. 18), which have all been replaced. The fancier homes featured hardwood doors with a single recessed panel below and a large single light above, as retained at 511-513 Plank Road, the <u>Type Six</u> house (See Fig. 63).

The third most frequent alteration is the construction of shed porches and additions, and the filling in of originally open porches. Of the twenty-five houses in the study group, seven originally featured porches. The two <u>Type Three</u> and single <u>Type Five</u> and <u>Type Six</u> houses featured ground floor porches that were notched out of corners, under overhanging second story bedrooms (See Fig.'s 51 & 45). The three <u>Type Two</u> houses featured very simple, open, shed-roofed porches of wood (See Fig.'s 18, 49). Of these seven original porches, six have been filled in to create new front rooms, a symptom of the difficulty of adding to the tailings block houses by demolishing side

or rear walls (See Fig.'s 33, 64 ,65, 30 & 32). Simple, shed-like additions were also built along the front elevation of three of the Type One houses: Nos. 427-431 Foote (See Fig.'s 66, 67, & 68), and one of the Type Four houses: No. 430-32 Wall Street (See Fig. 56). Altogether, new rooms have been created from original porches or added sheds at ten of the twenty-five houses in the study group.

Partial cladding of the houses, particularly at upper gables, has occurred at nine of the twenty five houses, and is limited to Type One and Type Three houses. All of the Type One houses on Foote Street have been clad in this manner, with horizontal or vertical wood siding, clapboard, or shingles, generally beginning at gable peak and continuing halfway down second story window (See Fig.'s 66, 67, 68, & 69). On Joyce Street, the majority of Type One houses have been treated similarly (See Fig.'s 23, 24, & 27), while No. 476 Joyce Street has clapboard only at its gable peak, and not extending down around the central window (See Fig. 25). The reason that wood cladding was limited to the gable peaks is found in the original tailings block construction. For most of the Type One houses, smooth-faced tailings block was used only at second floors, beginning at gable peak and extending midway down second floor windows. This smooth-faced block eventually weathered, revealing coarse aggregate masked by the uneven

texture of the rough-faced block below. Owners then covered up the uneven block at upper gables with wood siding. In some cases, no siding was used, but the gable peak was painted, as at 484 Joyce (See Fig. 29). In the case of 405 Foote Street, a Type Three house, stucco was applied directly to smooth-faced tailings block, and immediately failed (See Fig. 70). Vertical board siding was added to cover the stucco (See Fig. 33).

The final category of alterations is the painting of the houses. The tailings block itself has been coated with paint at only six of the twenty five houses in the study group. Almost all of the houses that have been painted are located on Foote Road: three Type One houses, Nos. 425, 427, and 429, and the two Type Three houses, Nos. 405 and 423 (See Fig.'s 69, 66, 67, & 33). The proximity of these five houses may account for the similarity of treatment: the tailings block is attractive in context, but might appear drab next to a freshly painted house. The sixth house to have been painted is also a Type One house, No. 484 Joyce Road (See Fig. 29).

A Survey of Houses in Study Group: Typical Condition (Exterior), Including Types of Deterioration and Causes

In general, the tailings block houses are in good condition. However, certain types of deterioration have occurred within each of the six house types. The Type One houses are generally in very good condition, in part because of their small size, the simplicity of their design, and their lack of projecting decoration. No settlement cracking is visible in any of the Joyce Road houses, except in the "monolithic" concrete entrance steps (See Fig. 28).

For the most part, projecting sill courses at ground level, and projecting string courses between first and second floors, are in excellent condition, with no evidence of displacement, few open joints, and little cracking. The projecting string course above the first floor at 482 Joyce Street does display horizontal cracking, and on closer examination, reveals a lack of vertical joints between smooth-faced blocks. To distinguish the surface texture and rhythm of the projecting string course from the coursed block above and below, the original builders used a smooth-faced block which was then coated with stucco, creating the illusion of a monolithic masonry band. The visible cracking in this string course at the east

elevation of No. 482 Joyce has developed as the very thin stucco skim coat has begun to fail, separating from the smooth-faced block substrate. This deterioration has gradually progressed, after years of differential shrinkage and expansion of coating and substrate during freeze-thaw cycles (See Fig. 28). The same failure mechanism has occurred at 474 Joyce Street, where the stucco skim coat has delaminated from a second story window sill, revealing the two smooth-faced blocks underneath (See Fig. 71). This same house displays one open joint in the stucco-coated block sill course (See Fig. 24). Although the thin stucco veneer over smooth-faced block, which did not allow for thermal movement of the substrate, has failed in several locations, the tailings block itself is in excellent condition. Only one sizable area loss was noted in decorative or projecting tailings block, at 480 Joyce Street, in the string course just to the left and above the entrance door (See Fig. 27).

The Type One houses along Foote Street lack projecting string courses, and are difficult to inspect due to the prevalence of paint coatings. It is significant to note that even where the tailings block remains unpainted, the projecting lintels and keystones have often been painted white, as at 472 and 474 Joyce Road (See Fig.'s 23 & 24). Like the siding over deteriorated gable blocks, the

painting of lintels and keystones has taken place only after deterioration has occurred and patching has been performed. Most, if not all, of the lintels lacking keystones have had original, spalled or deteriorated keystones removed. As mentioned in an earlier chapter, the keystones were not cast elements, but were created of wood and stucco. In general, however, construction was sound, and the projecting eaves of the Type One houses have protected these facades from water penetration and subsequent deterioration.

The three Type Two houses are generally in good condition, but display some of the same modes of deterioration as the Type One houses. The deterioration of keystones and sills, caused by a reliance on a thin stucco coating, occurs again here. Number 446 Wall Street, which has been well maintained and retains its original slate roof and porch, has had all its keystones removed, no doubt following their deterioration. The removal of the keystones and surrounding projecting layers of stucco has revealed the wood back-up material of the lintels. The wood appears somewhat rotten and sheds paint, a result of moisture trapped between the wood and the stucco veneer during the years that the keystones remained. Deflection has occurred in the running bond brickwork above the second floor window at the front elevation, indicating that the wooden lintel

is inadequate to carry the load of the heavy tailings brick making up the gable above. The thin coat of stucco covering the smooth-faced block sill below this window has also deteriorated and been removed, leaving an open joint between the two blocks (See Fig.s 31 & 72). Numbers 444 and 448 Wall Street retain keystones at upper floors, but have had them removed, and remaining, projecting, stuccoed lintels painted, at the ground floor (See Fig.'s 30 & 32).

The two <u>Type Three</u> houses are generally in very good condition, although both have been painted, making inspection difficult. Number 423 Foote Street retains keystones only at the ground floor, while no keystones remain at Number 405. No settlement cracking is visible at either house, and the deteriorated stucco which plagued Number 405 immediately following construction (See Fig. 70), has been covered in vertical wood planking (See Fig. 33). This vertical siding is somewhat deteriorated, indicating that the moisture problem which caused the original stucco to fail remains. The installers of the siding probably felt that to install furring or nailers over the block substrate, to create air space for ventilation behind the plank siding, would cause the siding to project too far from the face of the building.

The seven <u>Type Four</u> houses are generally in fair to good

condition, displaying settlement cracking in various locations due to their large size and lack of vertical expansion joints. Detailing which would allow for differential movement along long expanses of cement masonry walls would not be developed for years after the construction of the tailings block houses. Vertical cracking has typically developed along corners and between lintels and sills, two areas of weakness. At 417-19 Sherman Road, cracks have developed along the north elevation, running from the center of first floor lintels, stepping upwards through a projecting string course and ending at the center of second floor sills (See Fig. 73). These cracks have been caulked. Similar cracking has developed from lintel to sill along the west elevation of 430-32 Wall Street (See Fig. 56). Severe cracking has also occurred vertically at the northeast and northwest corners of this double house, with half-inch cracks progressing vertically right through the center of projecting, panel-faced quoins (See Fig.'s 74 & 75). These cracks have also been caulked, but periodically reopen.[3]

The single <u>Type Five</u> house is in good condition, and appears well-maintained. A network of hairline step-cracks has appeared in the gable ends of the house, which may be related to the weakness of the wooden lintels below. The brick of gable ends is in poor condition compared to the

tailings block, displaying open joints and some discoloration (See Fig. 76).

The single Type Six house is also in good condition, but displays deterioration which has resulted from its exuberant and sometimes poorly detailed decoration. The most serious problem is cracking of the roof slab of the remaining open porch (See Fig. 39). Another visible problem is the deterioration of the slate roof, which has been removed in many locations and replaced with roofing fabric and coated with tar (See Fig.'s 22 & 35). A final problem, not visible from the exterior, is the apparent outward movement of the second floor gabled roof of the two porches. This has exacerbated leaking, and resulted in gaps between plastered walls and ceilings at the closets housed in these locations. The carriage house displays corner cracking similar to that found at the Type Four house, 430-32 Wall Street (See Fig. 40). The causes of and solutions to all of these problems will be discussed in the chapter which follows.

CHAPTER NOTES

[1]Interview with resident of 430 Wall Street, October 8, 1989.

[2]Frederick Frederic F. Lincoln, "A Concrete Industrial Village," Cement Age: A Magazine Devoted to the Uses of Cement (September 1909), 162.

[3]Interview with resident of 430 Wall Street, October 8, 1989.

CHAPTER VI: CONCLUSION: MINEVILLE PRESERVATION

Recommendations for Future Maintenance and Repair of Housing

Mineville's tailings block houses have been altered in several ways, as described in the previous chapter. For the most part, however, the tailings block houses remain intact, presenting an appearance very similar to that documented in photographs taken at the time of their construction, eighty years ago. We can attribute the preservation of the tailings block houses to a phenomenon frequently observed within the preservation community: the poverty of a community limits the ability of its residents to perform "home improvement" alterations. The addition and filling in of front porches, perhaps the alteration with the greatest impact on the appearance of the houses, has declined proportionately with mining activity. Most of these additions date from the 1950's and 1960's, when mining operations were winding to a close.

Other alterations, including the replacement of slate roofs with metal or asphalt shingles, the partial cladding of tailings block with wood, aluminum, or vinyl siding, the partial or complete painting of facades, and the replace-

ment of original windows, have all been undertaken as home maintenance projects. New, affordable building materials have replaced or covered the original, faulty or deteriorated products. These repairs solve problems at least temporarily, but employ materials with a limited life-span. New metal or asphalt shingle roofs have replaced deteriorated and leaking slate roofs, but will not last nearly as long as the originals. New, energy-efficient windows, different in configuration from the originals, have replaced deteriorated and inefficient ones, but again, will not last as long. Paint and cladding have been applied over non-matching repairs to deteriorated tailings block, or have provided a short-term substitute for repointing. None of these projects have been undertaken with preservation principals in mind, because the tailings block houses have not been invested with historical, technological, or aesthetic significance. Instead, residents are stigmatized by the community at large; they are not from town, but from the tailings block "company houses." The long-term preservation of the tailings block houses will depend on the recognition, both within Mineville and Moriah at large, of their significance.

The tailings block houses are generally in good condition, but the typical modes of deterioration, if not reversed,

will eventually obliterate much of the ornament, and thereby the charm, of these houses. The previous chapter has described the failure of stucco coatings applied over block sills and string courses at houses Type One and Type Two. Where thin stucco coatings have failed, cracking and spalling, they should be sounded, and any loose material removed. Any open joints which remain between exposed blocks should be repointed as necessary. A thin mortar mixture using tailings aggregate could then be reapplied, or omitted altogether. Although not an ideal detail, the stucco coatings have lasted eighty years before failing. It is an aesthetic decision whether or not to maintain this smooth coating, which may be appropriately left to individual owners.

More serious is the problem of projecting lintels and keystones at houses Type One, Type Two, Type Three, and Type Five, which appear for the most part to be stucco applied directly to wood back-up. The ideal solution for these areas would be to replace these lintels with new, steel-reinforced, cast concrete lintels. However, this would be prohibitively expensive. Another possibility would be to remove inadequate wood lintels, and based on an engineer's recommendation, insert back-to-back steel angles, fronted by concrete block, and to coat this concrete with a tailings stucco, built up in half-inch

layers to replicate the original keystone and projecting masonry lintel. The final and most affordable solution is one which has already been practiced at the <u>Type Five</u> house, where the owner has removed the failing stucco veneer at lintels, and replaced the stucco with wood, maintaining the projecting, angled profile of the lintels and keystones, and painting these elements white to protect the wood (See Fig. 64). Assuming that the remaining lintels are structurally adequate, this repair is practical and does not markedly alter the appearance of the house. This lintel repair could be applied universally to all the tailings block houses featuring keystones.

A problem unique to the <u>Type Four</u> houses, and to the carriage house behind the <u>Type Six</u> house, is the development of settlement and corner cracks. For the most part, these are hairline cracks, and do not pose a serious problem. Where the cracks have progressed to 1/4" or more, the owners have typically caulked them on an annual basis. Unfortunately, readily available, light-colored caulk has been used, instead of a more appropriate dark gray or black caulk. Where cracks have opened 1/2" or more, as at 417-19 Sherman Road, it may eventually be necessary to first shore, and then take these corners down, rebuilding them with new vertical expansion joints. Wherever possible, original block would be reused; for block which has cracked

through, a source of salvaged block might be found. Finding the correct replacement block would be difficult, however, since the cracked blocks are special, panel-faced quoin blocks. Simple molds might be cast from existing, intact quoin blocks, and tailings block cement mixed in a 1:5 proportion, utilizing tailings from the surviving mounds.

Another area where cracks have appeared is the gable ends of the single Type Five house. This network of hairline step-cracks may be related to the weakness of the wooden lintels below. The brick itself is in poor condition compared to the tailings block, displaying open joints and some discoloration. The brick may perform more poorly than the block because of a difference in their manufacture: the brick were composed of a 1:3 mixture of cement to tailings, creating a harder, less plastic material than the 1:5 tailings block. The cracking is relatively minor, but the brickwork at gable ends is in need of repointing.

A structural problem has developed in at least one location, at the remaining open porch of the Type Six house. The roof slab has cracked as a result of inadequate reinforcement of this cast concrete element (See Fig. 39). This crack should be monitored over the course of two or three years, using "tell-tale" crack monitors, which use a

simple gauge to determine the extent of movement. If the crack is active, a remedial repair might involve the installation of steel straps at the base of the slab, spanning between vertical posts which support the porch roof.

A result of poor detailing is the lack of adequate roof flashing at the Type Six house. The owner has made localized repairs, removing failed slate and using roofing felt and mastic patches to bridge interior leaks, but the problem is ongoing (See Fig.'s 22 & 35). Ideally, new metal flashing should be installed at all ridges, angles, and valleys of the intersecting gambrel roofs. A final problem, not visible from the exterior, is the apparent outward movement of the second floor, gabled roof of the two porches. This movement has exacerbated leaking which had developed at the gable valleys, and has resulted in gaps between plastered walls and ceilings at the closets housed in these locations. Again, this should be monitored to determine if the movement is stable or ongoing. Adequate flashing should help prevent interior leaks in the future, but cracks will probably continue to develop at this sensitive joint between wall and ceiling.

For the most part, the repairs recommended here could be performed by the homeowners themselves, although some

training would be required to execute expert repointing. Since many of the houses display similar problems, it would be very helpful if homeowners could be trained together, through a one or two day long workshop: "Maintenance and Repair of the Tailings Block House." Sample repairs could be performed on actual houses; different seminars could arranged for specific problems or individual house types. Appropriate tools and materials might be distributed to interested homeowners. Organization and proposed funding for such a workshop is detailed in the section which follows.

Possible Sources of Funding for Housing Preservation

Very often, grants for historic preservation are tied to the certification of landmark status of a building or neighborhood by the municipal or state government. Mineville currently lacks such official designation, but has recently been studied as part of a reconnaissance level survey of historic resources in the town of Moriah, undertaken by the Essex County Planning Office and the Housing Assistance Program of Essex County. This survey was funded by a grant from the New York State Office of Parks, Recreation, and Historic Preservation, with technical assistance from the Preservation League of New

York State. This preliminary survey is the first step in generating a thematic National Register nomination, and one of its recommendations was that a more intensive survey be conducted "on all the historic resources attributable to the theme of iron mining and manufacturing."[1] This intensive survey would focus on remaining mining structures, both industrial and domestic, and would include the tailings block houses of Witherbee-Mineville. This intensive survey would then result in a National Register nomination.

Because this process is well underway, the following discussion of funding sources will assume that Mineville's tailings block houses have been listed in the National Register, as part of a thematic nomination recognizing Essex County's national dominance as an iron-producing region, c.1880. Once certified, Mineville's tailings block homeowners would have to create a community organization, giving homeowners the not-for-profit status which is another frequent requirement of grant programs. Because the tailings block houses are generally in good condition, funding requirements for exterior preservation work are low. However, the comfort and long-term desirability of the houses would be enhanced by an upgrading of mechanical systems, and by increasing the energy efficiency of the homes.

Programs designed to encourage the preservation of the tailings block houses should be developed in three areas, to be funded by different sources. The first, and most critical, would be educational programs, establishing the technological and historical significance of the tailings block houses. The second priority, aimed at preserving the buildings' exteriors, would be home maintenance and restoration workshops, which would train homeowners to make repairs to deteriorated wood and masonry elements themselves, providing tools, materials and funds for the repairs. The third type of program would assist owners in upgrading mechanical systems and increasing the energy efficiency of the tailings block houses.

Currently, information about the tailings block houses is available locally at the Port Henry Public Library, in the Witherbee Sherman Collection, and at the Brewster Library of the Essex County Museum and Historical Society. The Essex County Museum also has a permanent exhibition of photographs and artifacts depicting iron ore mining and domestic life in turn-of-the-century Witherbee-Mineville. This collection, lent by local mining historian and former Republic Steel Superintendent Patrick Farrell of Mineville, includes photographs of Mineville's tailings block houses, and the houses' earliest, immigrant residents. An

exhibition incorporating these photographs and others referenced in this paper could be held at the Essex County Museum, or in rented or donated public space in the commercial center of Moriah, Port Henry. This exhibit could also travel to the public schools, to be accompanied with month-long units on the mining history of the community, designed for elementary, junior, and high school levels. Former mine employees and local historians could be recruited to lead local school children on tours of remaining mine facilities and to give lectures; peer tours could be held, with the children of Witherbee and Mineville showing their classmates both the interiors and the exteriors of company housing. The tailings block houses should be celebrated, and their innovative exploitation of a local resource studied. A possible funding source for the exhibit and public school programs might be the New York State Council on the Arts, which provides funding for projects in the fields of architecture, architectural history, historic preservation, industrial design, and architectural documentation.[2]

Following the exhibit and educational programs, workshops could be organized to encourage the physical preservation of the tailings block houses. Workshops could be sponsored by a new not-for-profit community group, perhaps called the "Tailings Block Homeowners' Association." Help in

organizing this not-for-profit group might be available from the Community and Neighborhood Assistance Program (CNAP) of the New York State Department of State, which provides technical assistance and guidance to not-for--profit organizations in depressed communities of New York State.[3] CNAP might also help identify funding sources for home maintenance workshops. One possible source for workshops funding might be the previously mentioned New York State Council on the Arts. Another New York State source might be the Rural Areas Revitalization Program, a program of the New York State Division of Housing and Community Renewal, which provides grants of up to $100,000 to fund a portion of the expenses of a specific community revitalization project, including the preservation or improvement of housing resources.[4] If we assume that homeowners contributed the necessary labor, then remedial exterior repairs: spot repointing, caulking, and lintel restoration, would cost an average of less than $1000 per house in tools and materials, particularly if tools were shared. More elaborate repairs: slate roof replacement or wood window restoration, could cost up to $10,000 for the average house, again assuming that the homeowner could contribute at least some of the labor. This contributed labor might consist of laying new roofing substrate or installing flashing. Additional state funding for these more elaborate repairs might be available from the Historic

Preservation Matching Grant Program of the Environmental Quality Bond Act, which honors donated labor as "funds" to be matched. This program, administered through the New York State Office of Parks, Recreation and Historic Preservation, is available only to historic buildings listed on the State or National Register of Historic Places at the time of application.[5] Finally, technical and organizational assistance might be available through the privately funded Preservation League of New York State.

A program which might both serve the long-term preservation of the tailings block houses, and answer the needs and priorities of community residents, would be one which upgraded interior mechanical systems and improved the energy efficiency of the tailings block houses. Although the block houses were considered adequately insulated at the turn of the century, the hollow space built into the blocks has proved inadequate by modern standards. At least one resident mentioned the expedient of applying furring strips, fiberglass insulation, and aluminum or vinyl siding at the exterior of the tailings block house, a solution which has already been executed at 509 Plank Road (See Fig. 55).[6] Raising awareness of the significance of tailings block will help prevent this type of treatment in the future, but practical aid in reducing heating costs would be the most effective way to preserve the tailings block

houses from exterior insulation. Technical assistance in developing an alternative method of insulating the houses might be available through the Not-For-Profit Energy Conservation Program of New York State. This program is a partnership between the state and sixteen regional community foundations, which provide grants for technical studies, energy audits, workshops, and training.[7] Two federal sources might also provide funding: the Farmer's Home Administration, which provides FmHA Rural Housing Loans to not-for-profit organizations representing low-income families for the purpose of repairing homes in small rural communities; and the Neighborhood Reinvestment Corporation, a congressionally chartered corporation which provides housing rehabilitation loans to low-income families across the country.[8]

Mineville Preserved: The Tailings Block Houses as Monuments to the 19th Century Industry which Caused the Development of this Region

Mineville's tailings block houses are probably unique, and certainly the only houses of this type to be profiled in contemporary periodicals. As such, they are significant in the development of concrete block building technology. Because the tailings block is in such fine condition, these

houses may actually represent an improvement over modern concrete block construction, and a building technology which might be reproduced locally wherever iron ore is mined. The strongest argument for the preservation of the tailings block houses, however, does not rest with their significance to the history of building technology. The tailings block houses, nestled in the shadow of the tailings pile that made them possible, are important monuments to the history of the community which still occupies these houses. Mineville is now being recognized as the heart of the iron mining and manufacturing activity fundamental to the development of Moriah. It is to be hoped that this recognition by the county and state will translate into future education, training, and preservation investment in the tailings block houses of Mineville.

CHAPTER NOTES

[1]The Essex County Planning Office, Reconnaissance Level Survey of Historic Resources in the Town of Moriah, New York, August 1989, 144.

[2]Preservation League of New York State, Preservation Directory: A Guide to Programs, Organizations, and Agencies in New York State, 1988, 61.

[3]Preservation League of New York State, 69.

[4]Preservation League of New York State, 60.

[5]Preservation League of New York State, 66.

[6]Interview with resident of 430 Wall Street, October 8, 1989.

[7]Preservation League of New York State, 50.

[8]Preservation League of New York State, 35-36.

BIBLIOGRAPHY

In the Bibliography which follows, these abbreviations are used for archives consulted:

AVRY	Avery Library, Columbia University
BRWS	Brewster Library, Essex County Museum & Historical Society
BTLR	Butler Library, Columbia University
ECCH	Essex County Courthouse
ENLI	Engineering Library, Columbia University
NYPL	New York Public Library
NYHS	New York Historical Society
NYUL	New York University Library
PHL	Port Henry Public Library

Following each archive symbol, where applicable, is the call number used by that library for that reference.

BOOKS

Recent Books

Everest, Allan Seymour. Our North Country Heritage; Architecture worth saving in Clinton and Essex Counties. [Plattsburg, NY]: Tundra Books, 1972.
[NYPL, IRM (Clinton Co.) 73-1490]

Hyde, Floy S. Adirondack Forests, Fields and Mines: Brief Accounts and Stories. Lakemont, NY: North Country Books, 1974. (includes a chronology of Adirondack mining operations)
[NYHS, F127 .A2H9]

Mindess, Sidney, and J. Francis Young. Concrete. Englewood Cliffs,NJ: Prentice-Hall, Inc., 1981.
[ENLI, TA 439 M49]

Preservation League of New York State. Preservation Directory: A Guide to Programs, Organizations, and Agencies in New York State. Albany, New York: Preservation League of New York State.

Books Contemporary with Mineville's Construction: Trade Publications

Atlas Portland Cement Company. Industrial Houses of

Concrete & Stucco: A survey of the principle types and groups of permanently constructed Industrial Houses. New York: Atlas Portland Cement Company, 1918.
[NYPL, VBA+, v.38, No. 7]

Cornes, James. Modern Housing in Town and Country: Illustrated by Examples of Municipal and Other Schemes of Block Dwellings, Tenement Houses, Model Cottages and Villages; also, Plans and Descriptions of the Cheap Cottage Exhibition. London: B. T. Batsford, 1905.
[NYPL, MRG+]

Hering, Oswald C. Concrete and Stucco Houses: The Use of Plastic Materials in the Building of Country and Suburban Houses in a Manner to Insure the Qualities of Fitness, Durability and Beauty. New York: McBride, Nast & Company, 1912.
[AVRY, AA 7160 H4]

Meakin, Budgett. Model Factories and Villages: Ideal Conditions of Labour and Housing. (London: 1905) Reprint ed., New York: Garland Publishing, 1985.
[NYPL, TDN; AVRY, AA 7540 M461]

Newberry, Spencer Baird. Concrete Building Blocks. Philadelphia: Association of American Portland Cement Manufacturers, 1905.
[NYPL, VEA & VEO, p.v.2]

______________________. Hollow Concrete Building Construction. Chicago: Cement & Engineering News, 1905.
[NYPL, VEO p.v.5 no.1]

Palliser, Charles. Practical Concrete-Block Making: A Simple Practical Treatise for the Workman Explaining the Selection of the Materials and the Making of Substantial Concrete Blocks and Cement Brick, Together with Directions for Making Molds and Remarks on How to Obtain the Best Architectural Effects. New York: Industrial Publications Co., 1908.
[NYPL, VEO]

Essex County Histories

Biographical Review (Atlantic States Series of Biographical Reviews), [Biographical sketches of leading citizens of Essex and Clinton Counties]. Boston:

Biographical Review Publishing Co., 1896.
[NYPL, IRM, Essex Co.]

Smith, H. P., ed. History of Essex County, with illustrations and biographical sketches of some of its prominent men and pioneers. Syracuse, N.Y.: D. Mason & Co., 1885.
[NYPL, IRM, Essex Co.]

Watson, Winslow Cossoul [1803-1884]. A general view and agricultural survey of the County of Essex. Taken under the appointment of the New York State Agricultural Society. [Albany: 1853].
Also, Supplement.
[NYPL, IRM, Essex Co.]

____________________. Military and Civil History of the County of Essex, New York; and a general survey of its physical geography, its mines and minerals, and industrial pursuits.
Albany: J. Munsell, 1869.
[NYPL, IRM, Essex Co.]

Witherbee, Frank S. History of the Iron Industry of Essex County New York. [Keeseville, New York]: Essex County Republican, 1906. Pamphlet.
[PHL]

JOURNAL ARTICLES

Recent Articles in Architecture, Preservation, & Planning

Alanen, Arnold R. "Documenting the Physical and Social Characteristics of Mining and Resource-Based Communities." APT Bulletin
XI, No. 4 (1979) 49-68.
[AVRY, AC As75]

______________. "The Planning of Company Communities in the Lake Superior Mining Region." Journal of the American Planning
Association 45 (July 1979) 256-78.
[AVRY, AB P679]

Cotton, J. Randall. "Ornamental Concrete Block Houses." The Old-House Journal XII, 8 (October 1984) 165, 180-83.
[AVRY, AB O114]

Garner, John S. "Le Claire, Illinois: A Model Company Town (1890-1934)." Journal of the Society of

Architectural Historians 30 (Oct. 1971) 219-227.
[AVRY, AC Am 352]

Gillespie, Ann. "Early Development of the Artistic Concrete Block: The Case of The Boyd Brothers." APT Bulletin XI, No.2 (1979) 30-52.
[AVRY, AC As75]

Huxtable, Ada Louise. "Concrete Technology in U.S.A.: Historical Survey." Progressive Architecture (October 1960) 144-49.
[AVRY, AB P372]

Roth, Leland M. "Three Industrial Towns by McKim, Mead & White." Journal of the Society of Architectural Historians XXXVIII (December 1979) 317-347.
[AVRY, AC Am352]

Articles in Social Science Journals or Government Bulletins Contemporary with Mineville's Construction

Crowell, F. Elisabeth. "Painter's Row: United States Steel Corporation as Pittsburgh Landlord." Charities and the Commons XXI (October 1908-March 1909) 899-910.
[NYPL, SHA: NYUL, HC1.S9]

White, Joseph H. "Houses for Mining Towns." U.S. Mines Bureau Bulletin 87. Washington: Government Printing Office, 1914.
[NYPL, VHCA]

Articles in Trade Publications Contemporary with Mineville's Construction: Engineering

"Advancing the Architectural Appeal of Concrete Wall Units." Concrete-Cement Age 4 (April 1914) 195-98.
[NYPL, VEA +]

Aiken, W. A. "Slag as an Aggregate in Concrete, Paper read before the 17th annual meeting of the American Society for Testing Materials, Atlantic City, N.J., June 30-July 3, 1914." Railway Review 55 (August 15, 1914) 199-200.
[NYPL, TPB +]

"American Block Machines Abroad." Cement Age 9 (November 1909) 303-06.
[NYPL, VEA]

Babbitt, L. N. "Living in Concrete Houses, A Letter from L. N. Babbitt." Concrete-Cement Age 4 (April 1914) 190-91.
[NYPL, VEA +]

"Building Low Cost Concrete Houses in England." Concrete-Cement Age 4 (April 1914) 185.
[NYPL, VEA +]

"A City of Poured Houses: Model Dwellings for Wage Earners." Scientific American Supplement No. 1895 (April 27, 1912) 260.
[NYPL, *ZAN V1405]

"Cleveland Tests of Concrete Block." Concrete-Cement Age 2 (July 1913) 26-27.
[NYPL, VEA +]

"Concrete Block--A Symposium. Concrete-Cement Age 2 (March 1913) 139-142.
[NYPL, VEA +]

"Concrete Block Cottages Built Complete for $1500 Each." Concrete-Cement Age 2 (March 1913) 137-38.
[NYPL, VEA +]

"Concrete Block Cottages Built in England." Concrete-Cement Age 2 (February 1913) 73.
[NYPL, VEA +]

"Concrete Homes for Mine Workers." Concrete-Cement Age 2 (April 1913) 173-74.
[NYPL, VEA +]

"Concrete in Industrial Housing." Concrete (Aug. 1918) 55-7.
[NYPL, VEA+]

"Concrete Products--Architectural Considerations: The Materials for and Treatments of Surfaces of Concrete Building Stone." Concrete-Cement Age 2 (October 1913) 155-60.
[NYPL, VEA+]

"Concrete Stone Tooled by Machinery: Methods in Manufacture and Use of Products of the Onondaga Litholite Company." Concrete-Cement Age 2 (February 1913) 61-65.
[NYPL, VEA +]

Darlington, Thomas, M.D. "The Sanitary Aspect of Housing," Monthly Bulletin of the American Iron and Steel Institute I:9 (September 1913) 225-272.
[NYPL]

"The Development of Concrete Block." Concrete-Cement Age 2 (May 1913) 244-46.
[NYPL, VEA +]

Doubler, Charles H. "How to Produce Realistic Stone Facings." Concrete-Cement Age 1 (December 1912) 55-6.
[NYPL, VEA +]

Harridge, J. K. "Objections to Concrete Block, and the Answers." Concrete-Cement Age 5 (September 1914) 126.
[NYPL, VEA +]

Hering, Oswald C. "Concrete Block." Concrete-Cement Age 2 (February 1913) 77-78.
[NYPL, VEA +]

"House of Concrete Block, Attractive as to Color and Texture." Concrete-Cement Age 2 (June 1913) 297-98.
[NYPL, VEA +]

"House Built of Concrete Block with Interesting Facing." Concrete-Cement Age 4 (April 1914) 167.
[NYPL, VEA +]

"An Industrial Village on Garden Lines." Concrete-Cement Age 2 (March 1913) 136.
[NYPL, VEA +]

Keller, James C. "Boosting Better Block in Cleveland." Concrete-Cement Age 5 (September 1914) 127-28.

Kinney, W. M. and A. E. Cline. "Proper Mixtures in Brick Manufacture." Concrete-Cement Age 5 (October 1914) 163.
[NYPL, VEA +]

Lefevre, S. "Housing and Sanitation at Mineville." Mining and Metalurgy Bulletin 98 (Feb. 1915) 227-238.
[NYPL]

Lincoln, Frederic F. "A Concrete Industrial Village. Mineville, New York, in the heart of the Adirondack forests is being rebuilt in concrete. Wooden buildings fast disappearing. Low first cost, fire protection and small cost of repairs responsible for

the change." Cement Age 9 (September 1909) 158-165.
[NYPL, VEA; PHL]

"'Manufacturing' Concrete Houses at Low Cost--Work at Midland, Pa." Concrete-Cement Age 4 (April 1914) 159-60.
[NYPL, VEA +]

McGann, W. F. "Why are not More Concrete Brick Used?" Concrete-Cement Age 4 (August 1914) 77-78.
[NYPL, VEA +]

Newman, Rolf R. "A Review of the Development in the Construction of Concrete Houses--1907 to 1914." Concrete-Cement Age 4 (April 1914) 168-70.
[NYPL, VEA +]

Norris, J. Frank, W. M. Kinney, and A. E. Cline. "Objections to Concrete Block, and the Answers." Concrete-Cement Age 5 (August 1914) 71-73.
[NYPL, VEA +]

"Some Attractive Dwellings Near Pittsburgh." Concrete-Cement Age 1 (December 1912) 57-58.
[NYPL, VEA +]

"Ten fire-proof houses of field and pre-cast concrete." Concrete (Aug. 1918) 69-71.
[NYPL, VEA+]

Thompson, C. C. "Spraying Freshly Made Block." Concrete-Cement Age 2 (January 1913) 25.
[NYPL, VEA +]

"Wet Process Block Machine." Concrete-Cement Age 2 (January 1913) 53.
[NYPL, VEA +]

Newspaper Articles Contemporary with Mineville's Construction

"Witherbee Sherman Co. Suffers Severe Loss." Plattsburgh Sentinel (June 19, 1914).
[Cited by Barbara Denton in paper at BRWS]

MAPS

1858 J.H. French, Super. of the New York State Survey. Map of Essex Co., New York. Philadelphia: E.A. Balch, Publishers, 1858. (Moriah shown divided into

squares or plats; includes Port Henry. Area of Mineville outlined but not designated except to indicate structures and plot owners, including M. & L. Reed, D. Weatherbee, and the American Mineral Co. Three separators are indicated and an area is marked "iron ore."
[NYPL, Map Div.]

1876 O.W. Gray & Son. New Topographical Atlas of Essex County, New York. Philadelphia: O.W. Gray & Son, 1876. Atlas includes charts showing population of Moriah, including Mineville and Port Henry, in 1845,50,55,60,65,70, & 75; County Manufactures and Iron Mining, giving numbers of employees and dollars generated (in 1875); and town maps including Mineville. Also included are engraved plates illustrating churches and homes, including St. Peters and St. Pauls Church in Mineville --a simple gothic revival church and greek revival/italianate house and barn; and commercial buildings and residences in Port Henry. Plate 41, Map of Mineville, is in scale of 20 rods to 1 inch. Map shows two active mines at center of town, several stores to west, church and school to southeast, with the J. Keough hotel, and approximately 70 houses/structures/lots with individual owners designated.)
[NYPL, Map Div.]

1911 Essex County New York. Everts Publishing Co.: 1911. (Map shows Mineville, Moriah Center, and Port Henry as part of Moriah).
[NYPL, Map Div.]

1916 Sanborn Map Company. Mineville, Essex County, New York, October 1916, Including Witherbee. New York: Sanborn Map Company, 1916. (Insurance map shows Witherbee-Sherman & Co. property in 9 plates, indicating construction materials).
[BRWS]

1953 Essex County Highway Dept. Map of Essex County. Chester, VT: National Survey Co., 1953.
[NYPL, Map Div.]

1955 County of Essex, State of New York. Hamlets of Mineville & Witherbee, Town of Moriah. Plattsburgh, NY: Joseph J. Martina. Reg. Prof. Eng., November 1955. (Map filed with county is result of survey required prior to sale of company houses).
[ECCH]

MICROFORM EDITIONS

Rosenquist, Valerie Beth. The Iron Ore Eaters: A Portrait of the Mining Community of Moriah, New York. (Ph.D. Dissertation, Duke University) Ann Arbor, MI: UMI Dissertation Information Service, 1987.
[Facsimile Copy]

UNPUBLISHED MATERIAL

Brennan, Bob. Interview with Author. Mineville, Moriah, New York, 2 August 1988. (2nd generation resident and former employee of Republic Steel in Mineville. Lives in wood-frame company house dating from 19-teens.)

Denton, Barbara. "The Social and Economic Decline of a Mining Community." Undergraduate Sociology Paper, Plattsburgh State University, November 10, 1981. (Based on interviews with 21 former miners and their families. Denton cites a paperOper by the Essex County Rural Development Planning Project, "Directions for Development, Planning for Essex County in the 1980's," December 1979-December 1980, which found that the average per capita income in Mineville/Witherbee in 1977 was $5,225. Denton also interviewed Eleanor Hall, Moriah Town Historian.)
[BRWS]

Farrell, Patrick. Interview with Author. Mineville, Moriah, New York, 1 August 1988. (Author of unpublished manuscript, "History of Iron Mining in Adirondacks from Pre-Revolutionary Times to the Present." Retired engineer and former Superintendent of Witherbee/Mineville operations for Republic Steel (1930's-1960's). Lives in wood-frame company house dating from 19-teens.)

Gray, Bob and Leah. Interview and house tour with Author. Mineville, Moriah, New York, 3 August 1988. (Bob is a second generation resident and former employee of Republic Steel. The Grays live in a taling block company house, c.1908. Bob lived in the house beginning about 1935, when he was in high school; assumed occupancy from his parents, and bought the house in the 1950's.)

Stauffer, Sara. Cast Stone: History and Technology. (Master's Thesis, Historic Preservation, Graduate School of Architecture and Planning,Columbia University) New York: October 1982.
[AVRY, Classics Collection]

E. L. CONWELL & CO.

ESTABLISHED 1894

ENGINEERS - CHEMISTS - INSPECTORS

November 7, 1989

Ann I Friedman
200 Dean Street
Brooklyn, New York 11217

Re: Concrete Block With Iron Tailings Aggregate Manufactured c.1908, Mineville, New York

Dear Ms. Friedman:

The following is a report of our tests of pieces of concrete block recently submitted by you identified as shown above. Three (3) of the four (4) blocks were diamond saw cut into nominal 3" x 3" x 6" prisms for compression testing and the fourth piece for absorption.

LABORATORY NO. 461464

Compression and Absorption Tests - 3" x 3" x 6" Prisms

Specimen Mark	% Absorption (24 Hour Soak)	Compressive Strength (psi)	As Received Density (pcf)
1	---	4570	145.9
2	---	3790	150.1
3	---	3290	150.0
4	8.1	----	147.4

Enclosed is a sketch of the four (4) samples.

The above results indicate good quality concrete with physical properties which conform to present day standards for masonry units (ASTM C90, C145).

Respectfully submitted,

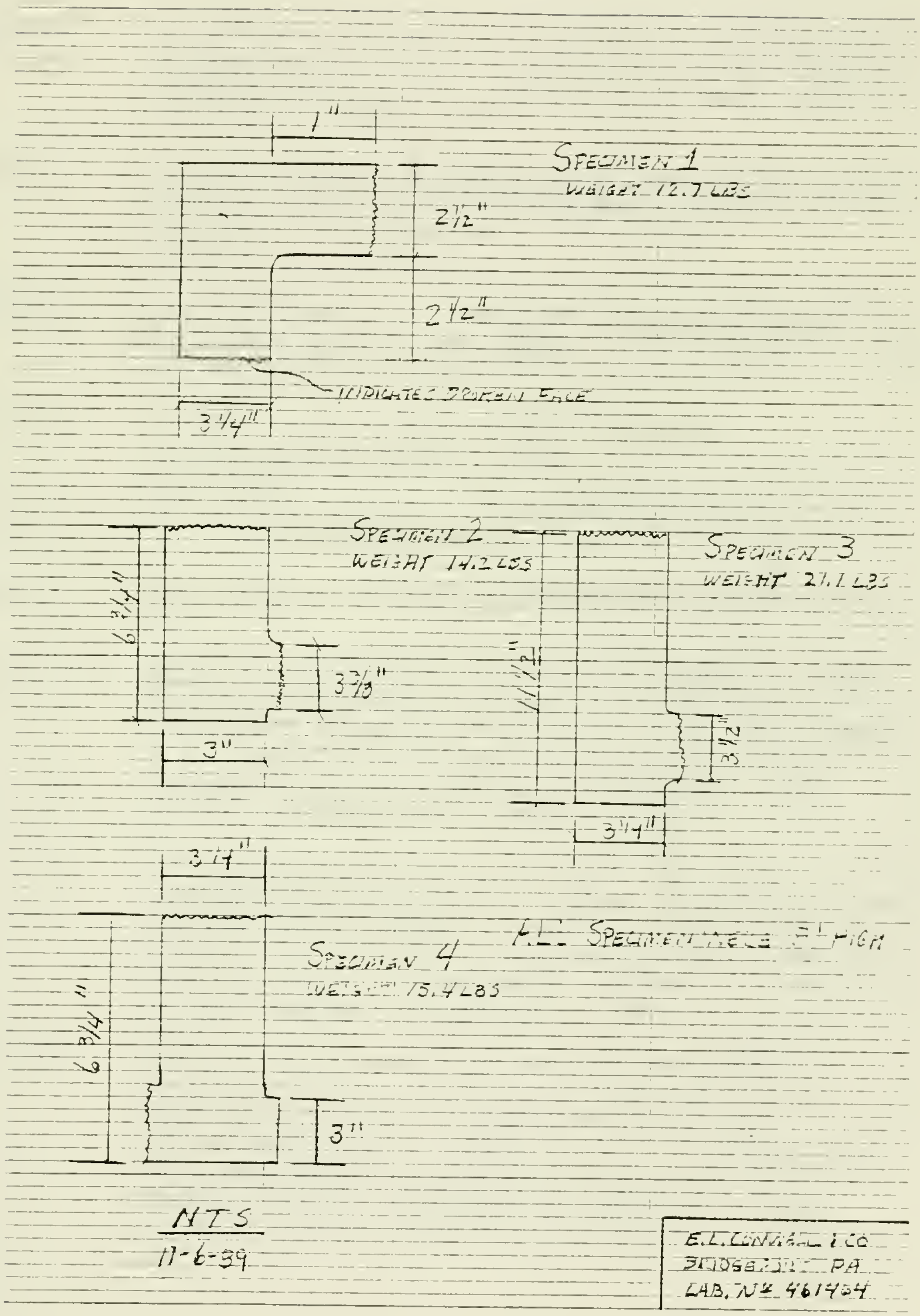
E. L. CONWELL & CO.

D.S. Spitzer

D. S. Spitzer, P.E.

DSS/nm
Enclosure

CONTINENTAL BUSINESS CENTER, FRONT & FORD STS., BRIDGEPORT, PA 19405 (215) 277-2402


SPECIMEN 1
WEIGHT 12.7 LBS
1"
2 1/2"
2 1/2"
INDICATES BROKEN FACE
3 1/4"
SPECIMEN 2
WEIGHT 14.2 LBS
6 3/4"
3 3/8"
3"
SPECIMEN 3
WEIGHT 21.1 LBS
11 1/2"
3 1/2"
3 1/4"
3 1/4"
SPECIMEN 4
15.4 LBS
6 3/4"
3"
NTS
11-6-39
PA
LAB. NO 461454

ILLUSTRATIONS

Figure 44 "Four-Family Tenement for Foreign Laborers," probably 303-309 West Street, Witherbee, with 293-299 and 285-291 West Street, to north, in background, c. 1915, as illustrated in S. Lefevre. "Housing and Sanitation at Mineville." Mining and Metalurgy Bulletin 98 (Feb. 1915) 235.

Figure 45 Type of single concrete block house occupied by clerks and foremen," No. 509 Plank Road, c.1913, as illustrated in Monthly Bulletin of the American Iron and Steel Institute I:9 (September 1913) 246.

Figure 46 "Double House of Concrete Blocks at Mineville," No. 503-505 Joyce Road, c. 1915, as illustrated in S. Lefevre. "Housing and Sanitation at Mineville." Mining and Metalurgy Bulletin 98 (Feb. 1915) 232-33.

Figure 47 Same house as Figure 45, No. 509 Plank Road, four years earlier (c.1909), photograph labeled "Concrete Block Residence of Attractive Design," in "A Concrete Industrial Village," by Frederic F. Lincoln, published in Cement Age 9 (September 1909), 163.

Figure 48 Photograph showing tailings-post and iron pipe rail fencing of six Norton Avenue Houses, c.1909, from "A Concrete Industrial Village," by Frederic F. Lincoln, published in Cement Age 9 (September 1909), 164.

Figure 49 Photograph showing Type Two Houses, c. 1908, 444-448 Wall Street, Mineville Collection, Essex County Historical Society, Courtesy Patrick Farrell.

Figure 50 Photograph showing 444 Wall Street, c.1910, Mineville Collection, Essex County Historical Society, Courtesy Patrick Farrell.

Figure 51 Photograph showing a Type Three House, No. 423 Foote Street, c.1910, Mineville Collection, Essex County Historical Society, Courtesy Patrick Farrell.

Figure 52 Photograph detail, 423 Foote Street, c.1910, Mineville Collection, Essex County Historical Society, Courtesy Patrick Farrell.

Figure 1

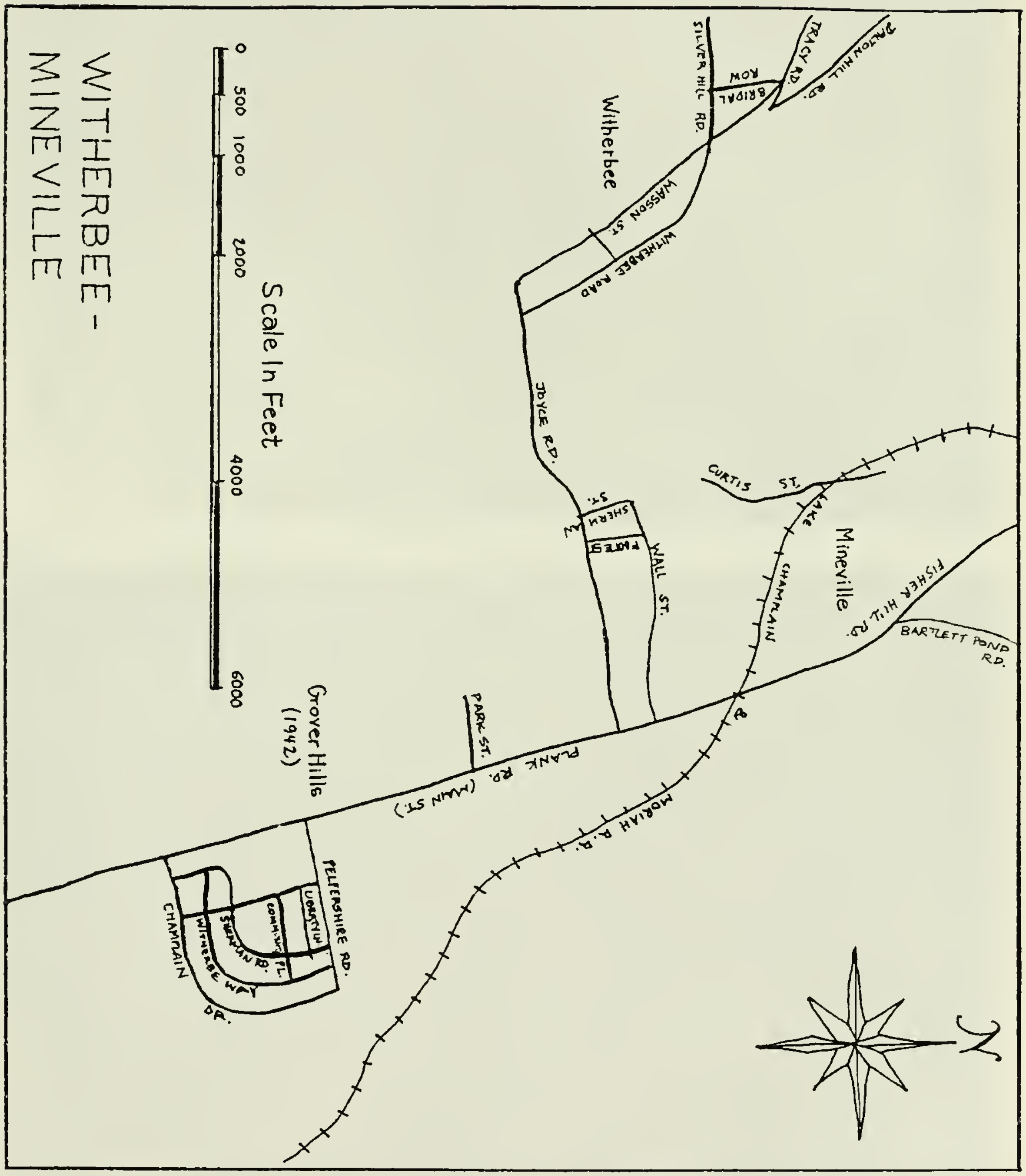

WITHERBEE - MINEVILLE
Scale In Feet
0 500 1000 2000 4000 6000
Witherbee
Mineville
Grover Hills (1942)
SILVER HILL RD.
BRIDAL ROW
TRACY RD.
WASSON ST.
WITHERBEE ROAD
JOYCE RD.
CURTIS ST.
WALL ST.
LAKE CHAMPLAIN
FISHER HILL RD.
BARTLETT POND RD.
PARK ST.
PLANK RD. (MAIN ST.)
MORIAH R.R.
PLEASANT PL.
WITHERBEE WAY DR.
CHAMPLAIN

Figure 2

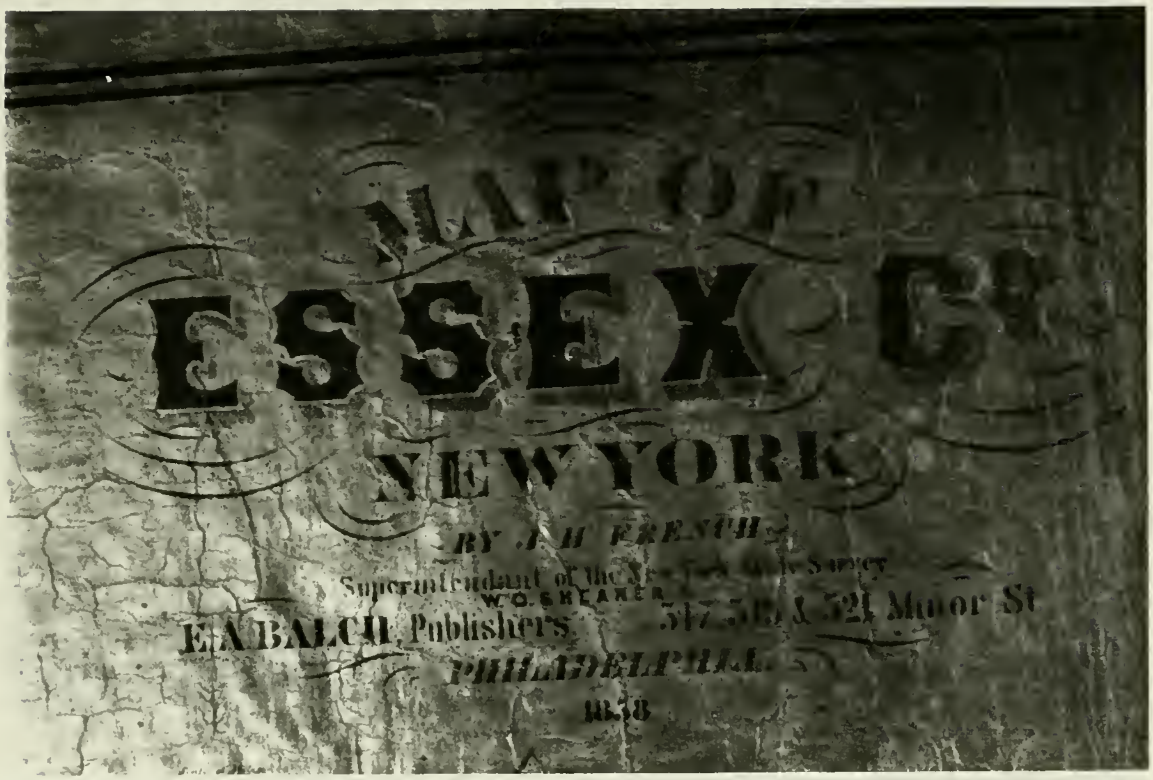


Figure 3

Figure 4

Upper Plank Road

Figure 5

Figure 6

Figure 7

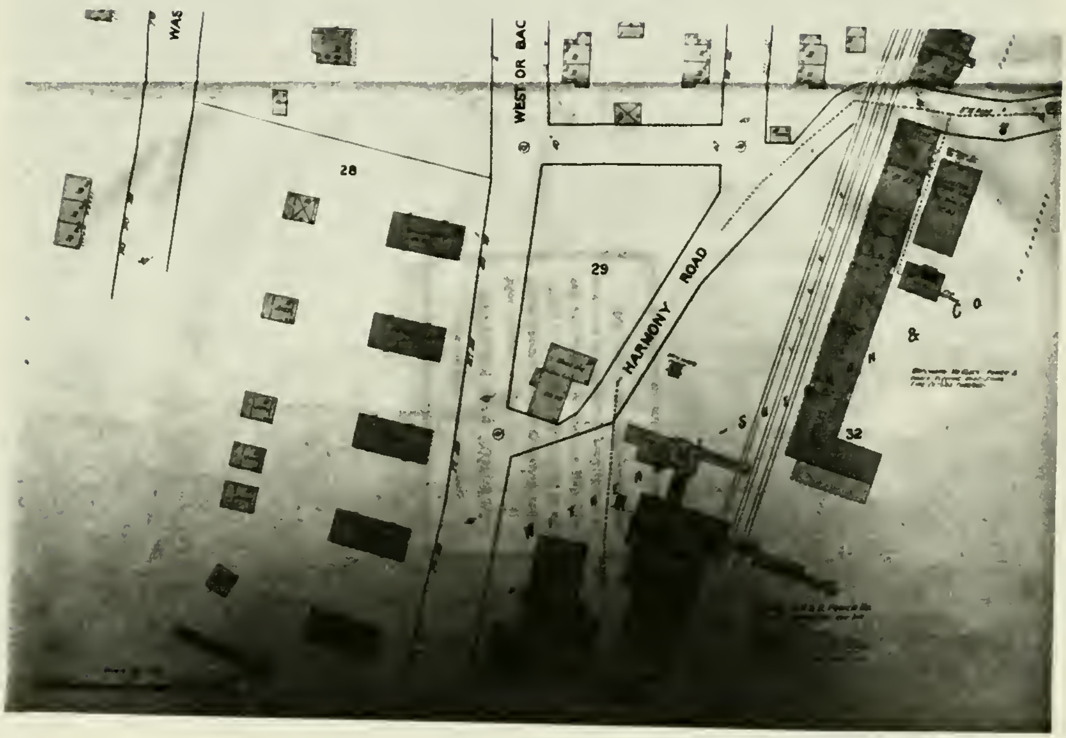


Figure 8

Figure 9

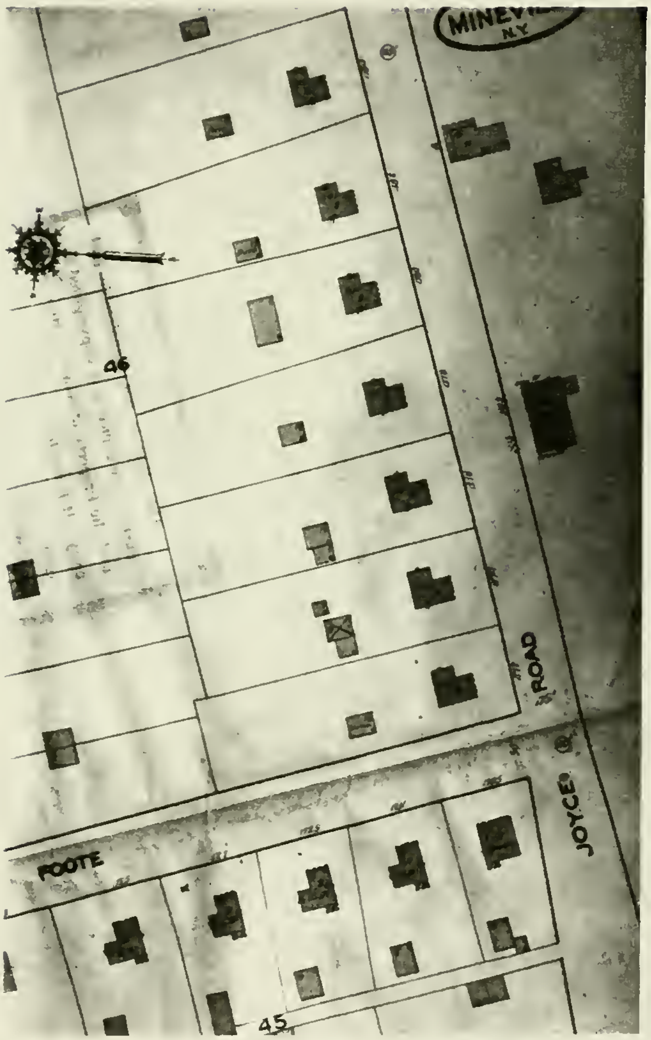


Figure 10

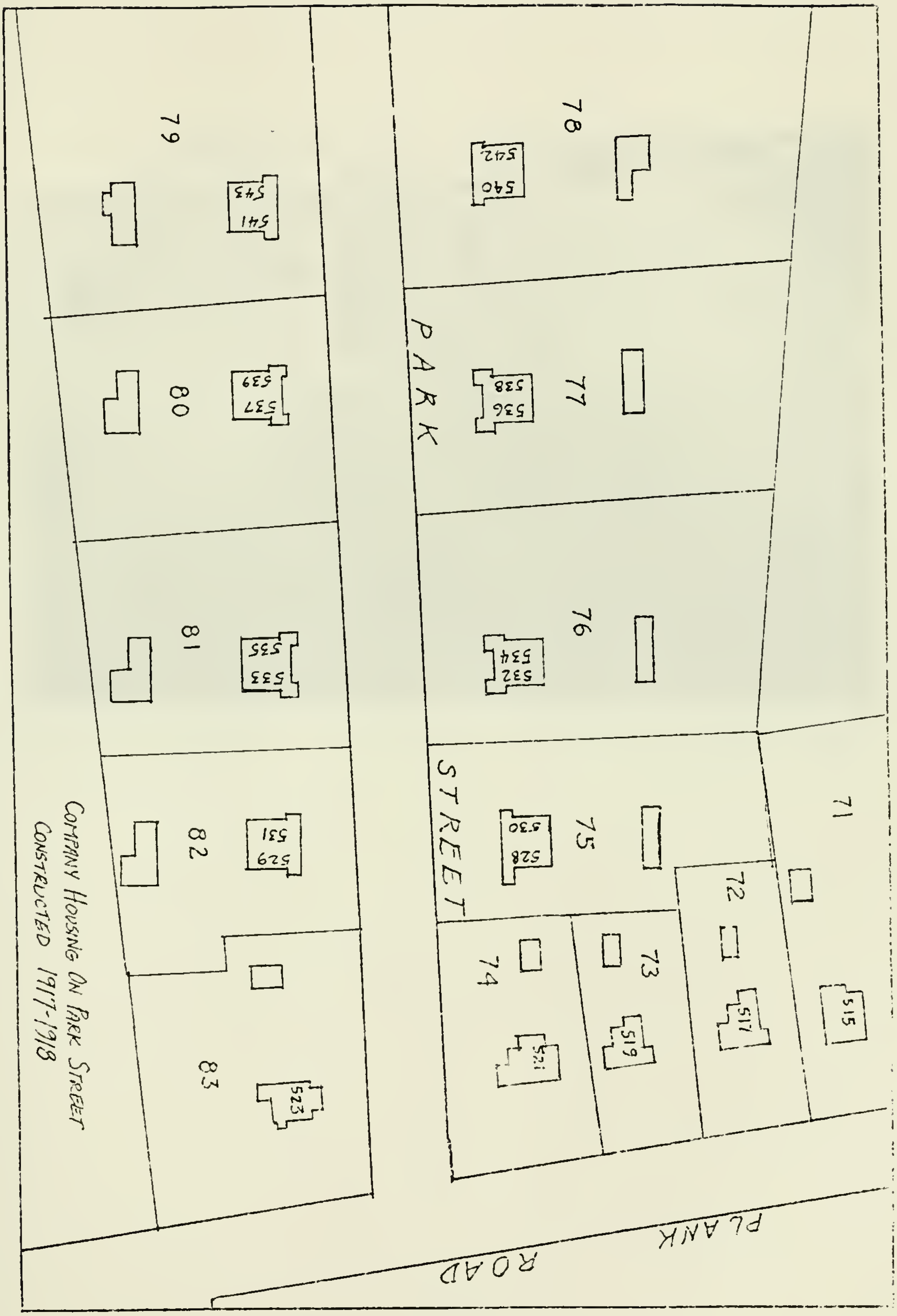

Company Housing On Park Street
Constructed 1917-1918
PARK STREET
PLANK ROAD
78
79
77
80
76
81
75
82
83
74
73
72
71
540
542
541
543
536
538
537
539
532
534
533
535
528
530
529
531
523
521
519
517
515

Figure 11


22
MAIDEN LANE
WASSON
WEST OR BACK ROAD
DRIVE
DRIVE
DRIVE
29
(41)

Figure 12

OCT. 1916
MINEVILLE
N.Y.
WITHERBEE
4
DRIVE
WASSON
WEST OR BACK ROAD
LAMOS
PL.
25
27

Figure 13

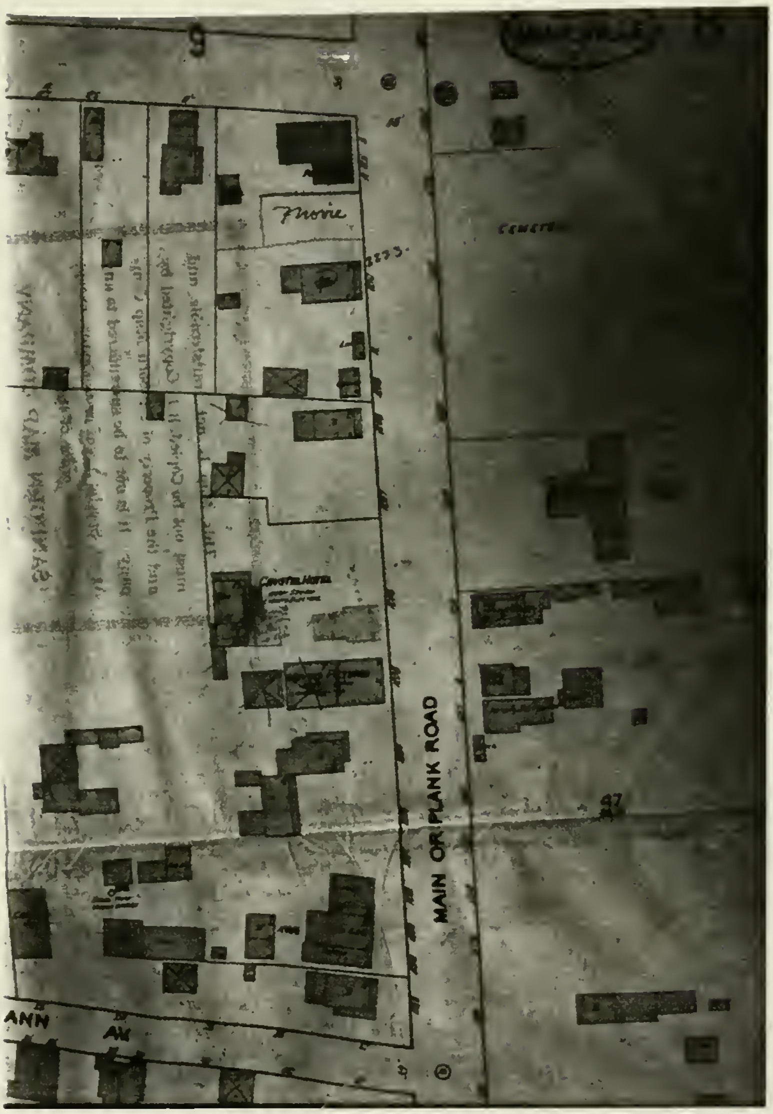
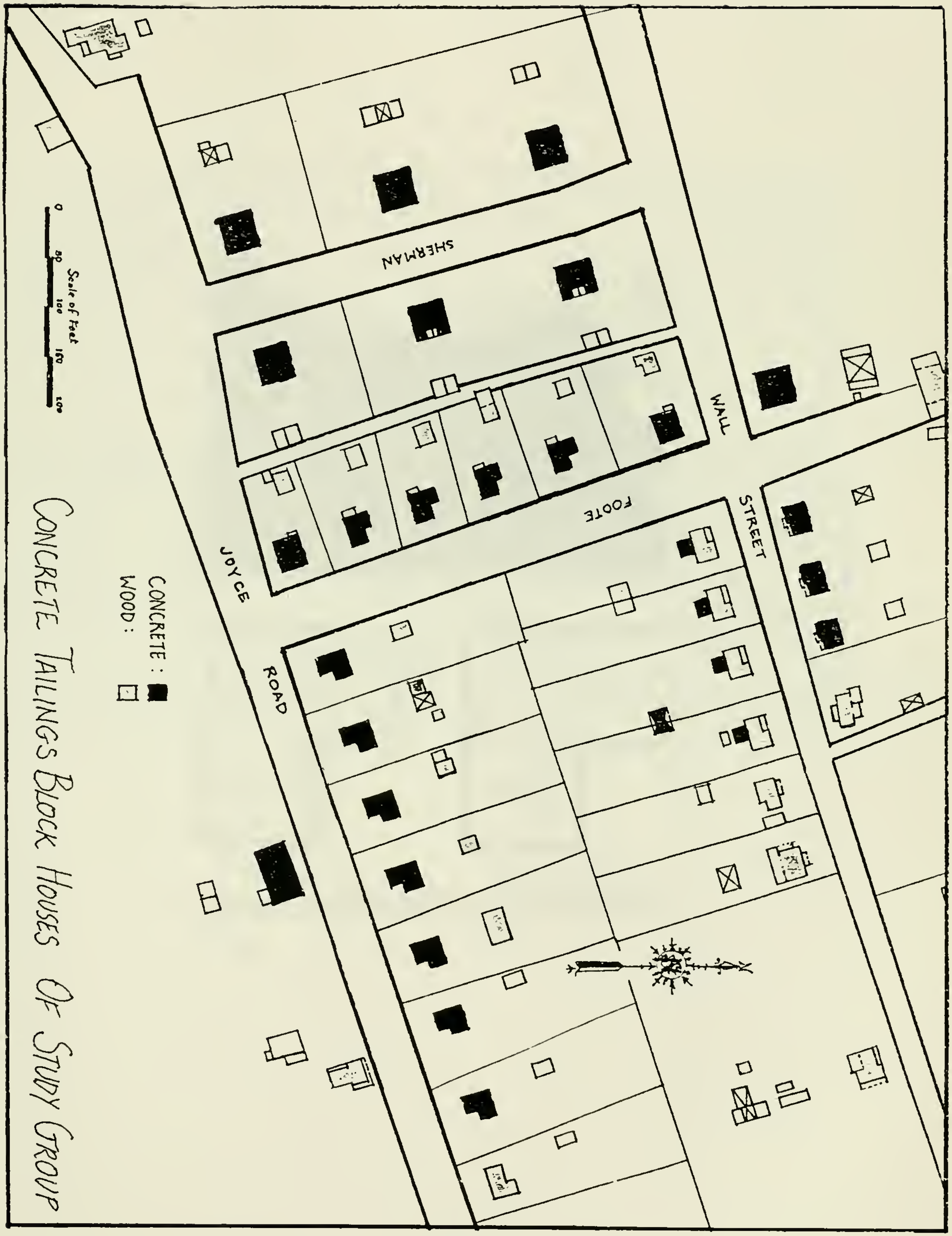
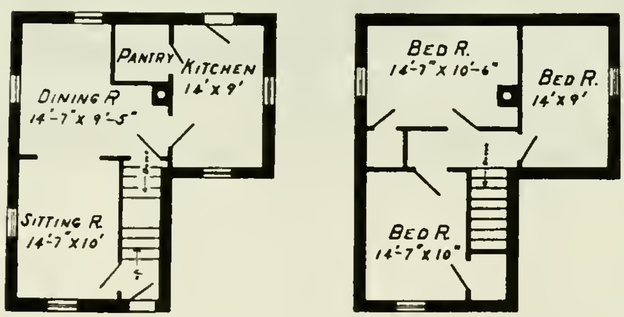


Figure 14

Figure 15


CONCRETE TAILINGS BLOCK HOUSES OF STUDY GROUP
CONCRETE :
WOOD :
Scale of Feet
0
50
100
150
200
SHERMAN
WALL
STREET
FOOTE
JOYCE
ROAD

Figures 16 and 17



FIRST FLOOR PLAN

SECOND FLOOR PLAN

FIG. 6.—SINGLE HOUSE WITH SIX ROOMS; NO HEAT OR PLUMBING; SHINGLE ROOF. COST $950, AND INDIVIDUAL FRAME BARN, $100. RENT $8 PER MONTH, INCLUDING BARN.

Figure 18

Figure 19

Figure 20

Figure 21

WITHERBEE, SHERMAN AND COMPANY, MINEVILLE, N. Y.
Type of double concrete block houses occupied by machinists, etc., rent, $8.50 per month per side.

216

Figure 22

Figure 23

Figure 24

Figure 25

Figure 26

Figure 27

Figure 28

Figure 29

Figure 30

Figure 31

Figure 32

Figure 33

Figure 34

See Figure 60

Figure 35

WITHERBEE, SHERMAN AND COMPANY, MINEVILLE, N. Y.
Tenement houses of concrete block construction, slate roof, four rooms each; rent, $6 per month.

Figure 36

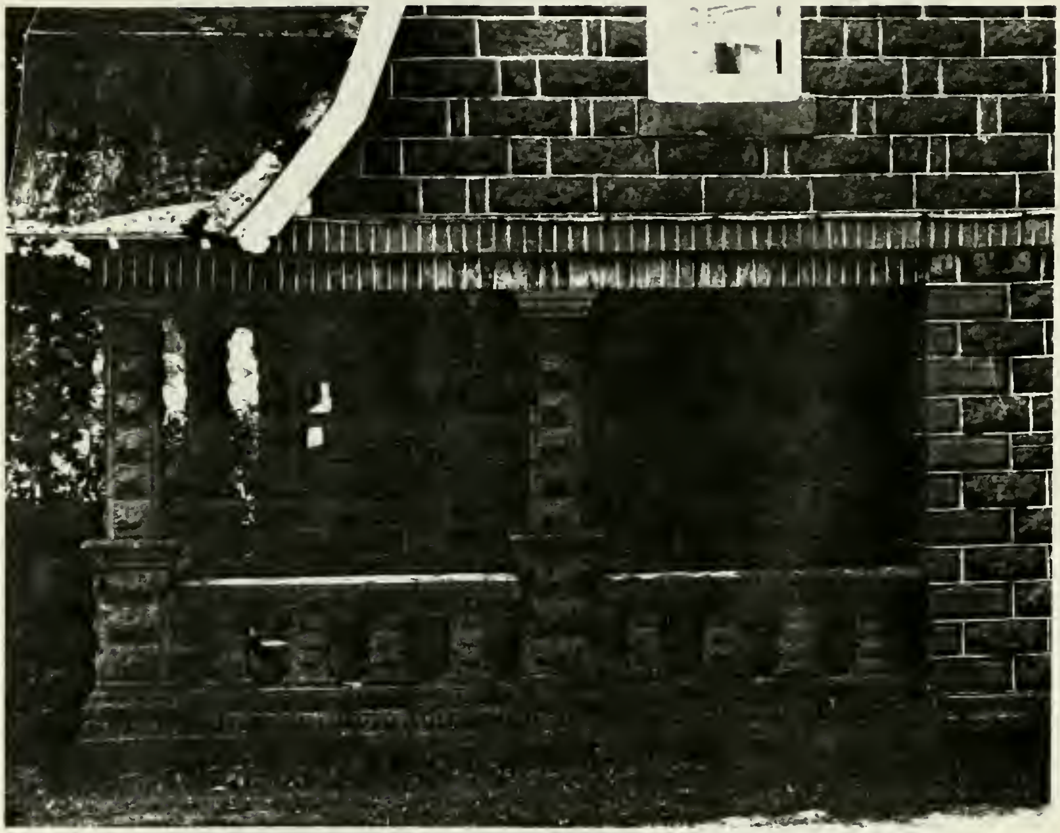


Figure 37

Figure 38

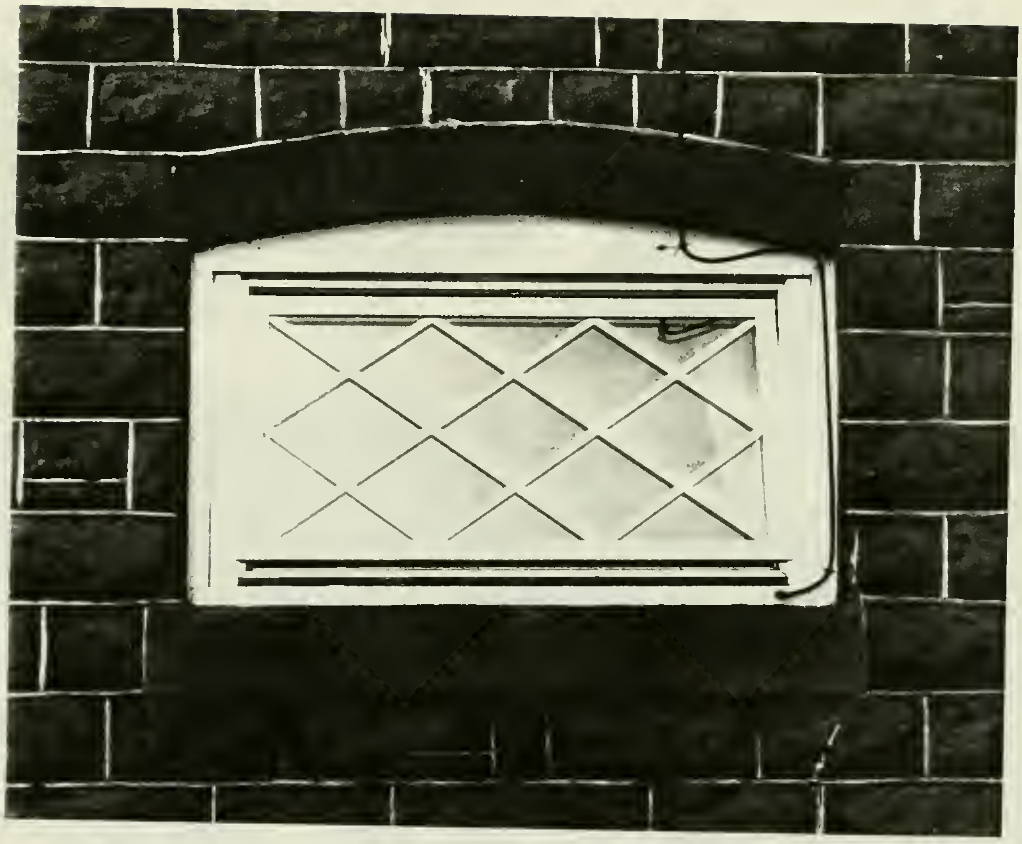


Figure 39

Figure 40

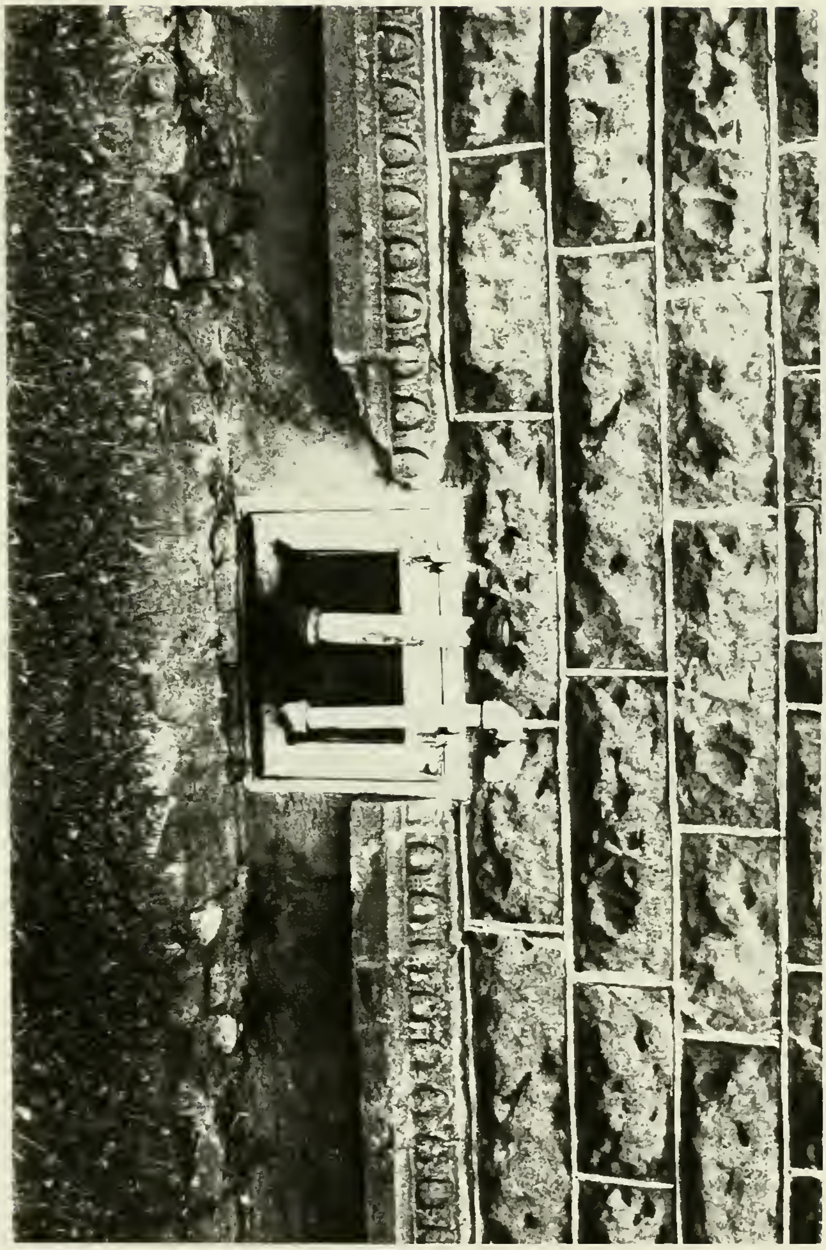


Figure 41

Figure 42

Figure 43

Figure 44

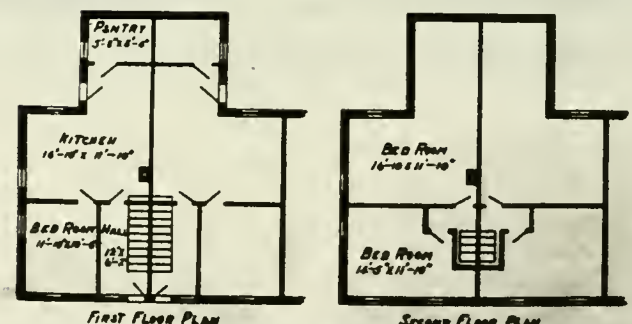


Fig. 7.—Four-Family Tenement for Foreign Laborers. Size 70 by 26 Ft.; Cellar 70 by 12 by 7 Ft.; Slate Roof. Cost $3,000, or 6c. per Cubic Foot. Rent $5.50 per Month, including Barn.

Figure 45

WITHERBEE, SHERMAN AND COMPANY, MINEVILLE, N. Y.
Type of single concrete block house occupied by clerks and foremen; rent, $12 per month.

Figure 47

Figure 48

FIG. X.—THE FIRST CONCRETE HOUSES BUILT AT MINEVILLE.

Six rooms and unfinished attic. 25 feet by 22 feet. Cost 9 cents per cubic foot.

Figure 49 and 50

(See Figure 18)

Figure 51

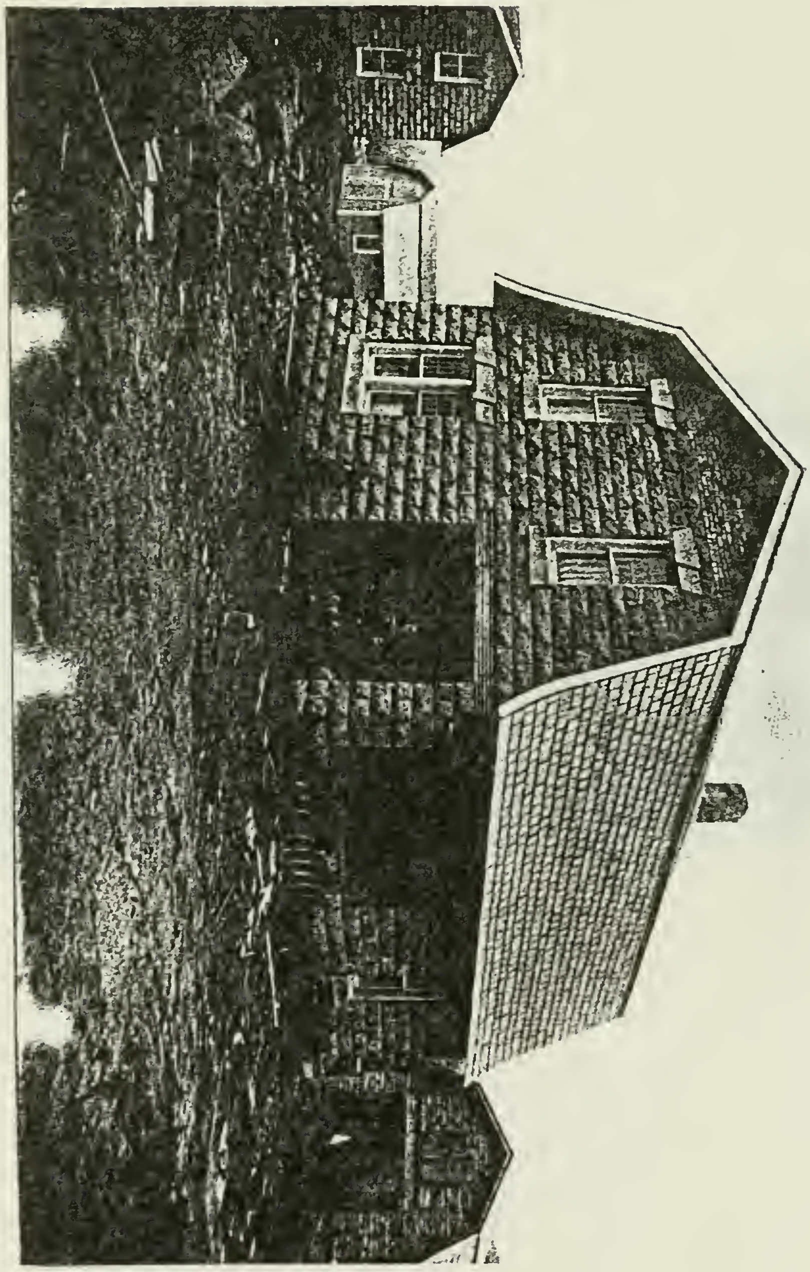


Figure 52

Figure 53

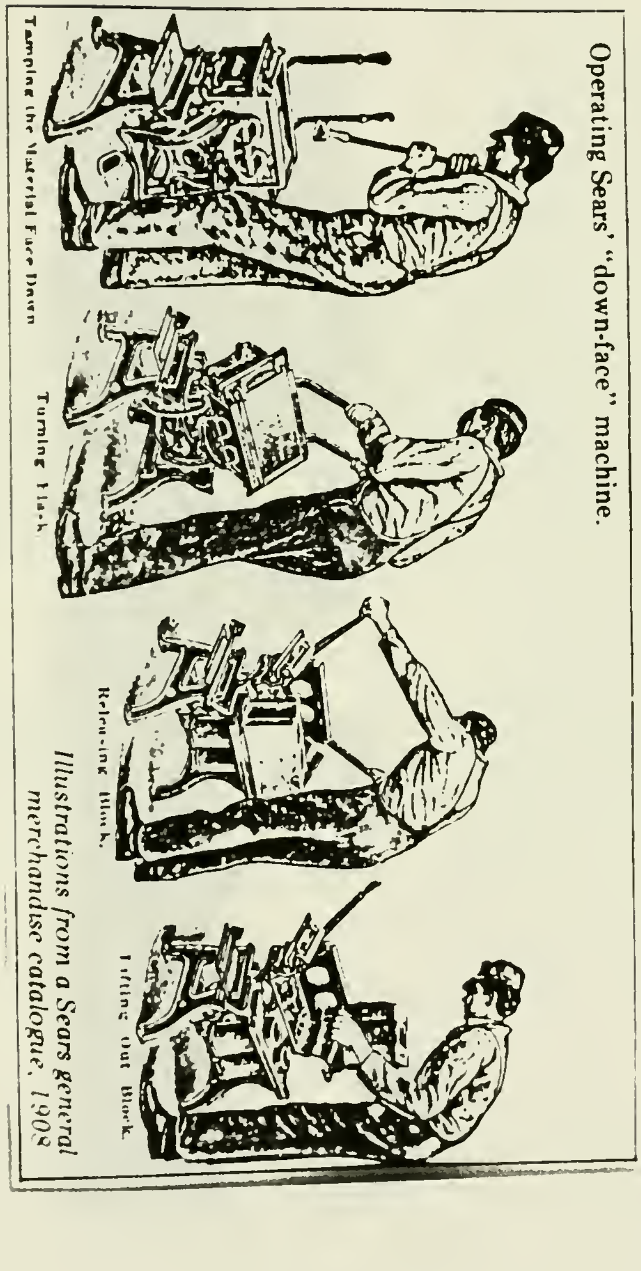

Operating Sears' "down-face" machine.
Tamping the Material Face Down
Turning Flask
Releasing Block
Lifting Out Block
Illustrations from a Sears general merchandise catalogue, 1908

Figure 54

Figure 55

Figure 56

Figure 57

Figure 58

Figure 59

Figure 60

Figure 61

Figure 62

Figure 63

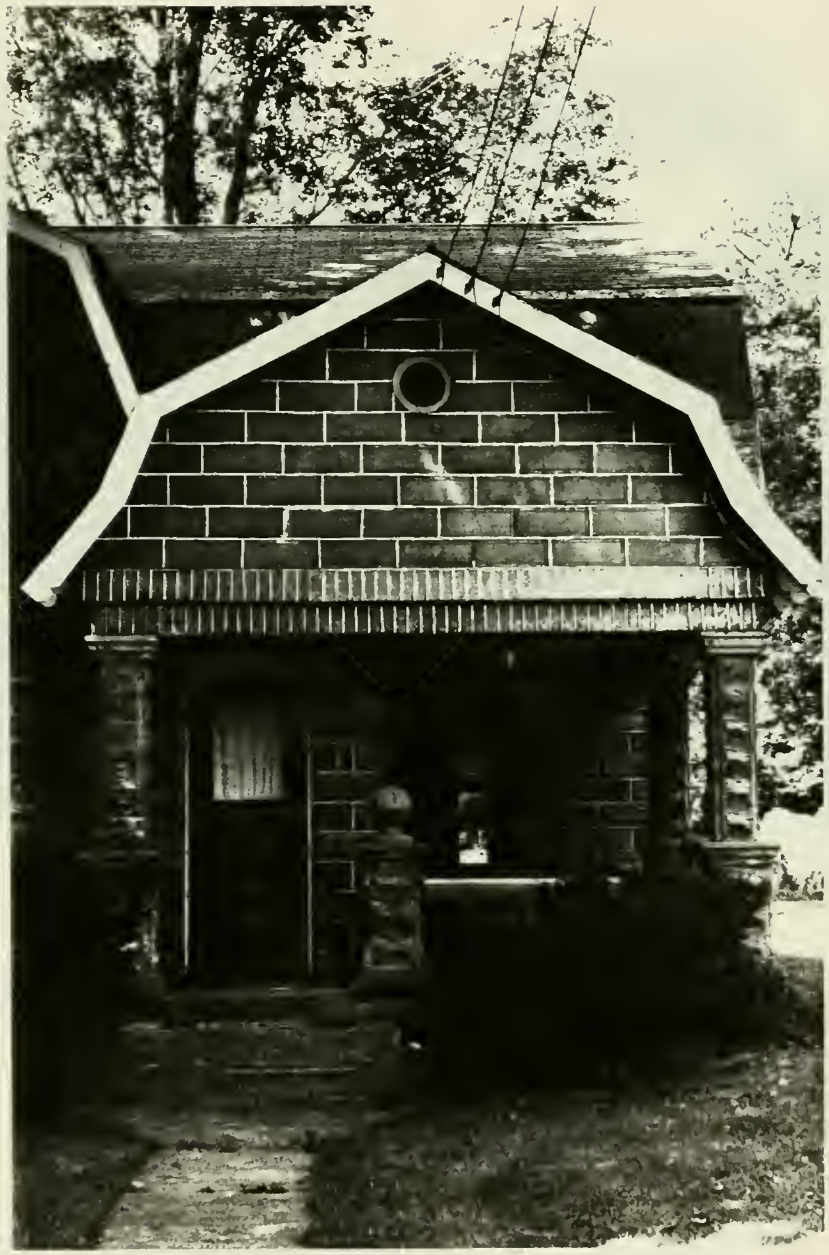


Figure 64

Figure 65

Figure 66

Figure 67

Figure 68

Figure 69

Figure 70

Figure 71

Figure 72

Figure 73

Figure 74

Figure 75